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Deploying very high-capacity networks: Understanding the State aid policy drivers in France, Portugal, Spain and United Kingdom

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PhD in Public Policies

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NOVA University Lisbon

December, 2025

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December, 2025

Nothing is possible without men; nothing is lasting without institutions. – Jean Monnet

Acknowledgements

My first words go to my supervisors, Professor Sandro Mendonça and Professor Bruno Damásio. It has been a privilege to work under their guidance throughout this thesis. Their feedback, support, and constant encouragement have turned this research into a far more meaningful and rigorous work than I could have envisioned. Their expertise and intellectual generosity have opened my eyes to new academic horizons, for which I am profoundly thankful.

I extend my sincere appreciation to the Instituto Universitário de Lisboa – ISCTE, and in particular to the Department of Sociology and Public Policy, where this doctoral journey took place. The lessons I received, and the excellence of the faculty were fundamental in equipping me with the core concepts of public policy, enabling me to complete this endeavour successfully. Any errors or limitations of this research remain entirely my responsibility and are independent of the teachings imparted to me.

I also wish to thank the reviewers and editors of several journals who devoted their time to assessing the manuscripts derived from this research. Their thoughtful comments and constructive suggestions greatly enriched the final outcomes of those publications. In particular, it was a particular satisfaction to see part of my research published in such a highly regarded academic journal that I had considered as the gold standard for work in the field, *Telecommunications Policy*.

An acknowledgment is also due to ANACOM for its financial support of my doctoral studies, without which this work would not have been possible.

Finally, I extend my thanks to my family and friends for their unfailing encouragement. In particular, to my parents, Ariete and Rafael, and to my aunt and uncle, Inês and Aires, for instilling in me curiosity, perseverance, and a commitment to my goals. And to my partner, Sara, for her patience and support. This achievement belongs to you as much as it does to me.

This has been a demanding yet rewarding journey, driven by the joy of discovery and the pursuit of scientific knowledge.

Resumo

Esta tese investiga como os fatores institucionais moldam a governança das medidas de auxílio estatal para a implantação da banda larga na União Europeia (UE), com especial incidência em França, Portugal, Espanha e Reino Unido. Questiona por que países que enfrentam objetivos e diretrizes semelhantes da UE adotam modelos de governança contrastantes, que vão desde modelos nacionais centralizados até modelos descentralizados e multiníveis envolvendo autoridades subnacionais. Combinando um mapeamento à escala da UE das medidas de auxílio à banda larga com estudos de caso comparativos e *process tracing*, a tese identifica configurações de governação distintas e os mecanismos institucionais que as sustentam ou desafiam. Com base num quadro institucionalista histórico, mostra como os legados institucionais, as tradições administrativas e os momentos críticos influenciam a conceção e a evolução da governação dos auxílios estatais à banda larga, enquanto a teoria da governação multinível explica a distribuição vertical da autoridade entre os atores nacionais e subnacionais. As conclusões revelam que a França e o Reino Unido desenvolveram modelos mais adaptáveis e descentralizados, tirando partido da flexibilidade institucional e das reformas de descentralização anteriores, enquanto Portugal e Espanha permaneceram limitados por estruturas centralizadas, capacidade administrativa subnacional limitada e inércia institucional.

Defende-se que não existe um modelo único de governação ideal aplicável a todos os Estados-Membros. Salienta-se também a necessidade de os decisores políticos alinharem as intervenções em matéria de infraestruturas digitais e de banda larga com as capacidades institucionais existentes, investirem nas capacidades subnacionais nos casos em que se procura a descentralização e reforçarem os mecanismos de coordenação em contextos multiníveis. Futuras investigações deverão comparar o desempenho e os resultados em termos de equidade de diferentes modelos de governação em todos os setores e países e examinar como as iniciativas em curso da UE, tais como o Mecanismo de Recuperação e Resiliência e os Projetos Importantes de Interesse Europeu Comum, remodelam ainda mais a governação dos auxílios estatais.

Palavras-chave: Auxílios de estado; governança; fratura digital; política de infraestruturas digitais; banda larga; institucionalismo histórico

Abstract

This thesis investigates how institutional factors shape the governance of State aid measures for broadband deployment in the European Union (EU), focusing on France, Portugal, Spain, and the United Kingdom. It asks why countries confronted with similar EU objectives and guidelines have adopted contrasting governance models, ranging from centralised national schemes to decentralised, multi-level arrangements involving subnational authorities. Combining an EU-wide mapping of broadband State aid measures with comparative case studies and process tracing, the research identifies distinct governance configurations and the institutional mechanisms that sustain or challenge them. Drawing on a historical institutionalist framework, it shows how institutional legacies, administrative traditions, and critical junctures influence the design and evolution of broadband State aid governance, while multi-level governance (MLG) theory explains the allocation of authority between national and subnational actors. The findings reveal that France and the United Kingdom developed more adaptive and decentralised models by leveraging institutional flexibility and prior decentralisation reforms, whereas Portugal and Spain remained constrained by centralised structures, limited subnational administrative capacity, and institutional inertia.

The thesis argues that no single governance model is universally optimal for all member states. It highlights the need for policymakers to align broadband and digital infrastructure interventions with existing institutional capacities, invest in subnational capacity where greater decentralisation is pursued, and strengthen coordination mechanisms in multi-level settings. Future research should compare the performance and equity outcomes of different governance models across sectors and countries, and examine how ongoing EU initiatives, such as the Recovery and Resilience Facility and Important Projects of Common European Interest, are reshaping State aid governance.

Keywords: State aid; governance; digital divide; digital infrastructure policy; broadband; historical institutionalism

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CHAPTER 1

Introduction

1.1. Context: EU broadband policy and State aid for very high-capacity network (VHCN) deployment

Over the past two decades, the European Union (EU) has made broadband connectivity a pillar of its economic and social development agenda. High-speed internet access is now widely recognised as essential infrastructure, fundamental for enabling economic growth, innovation, and social inclusion across both urban and rural regions (Briglauer et al., 2021). The deployment of these networks is not merely a technical upgrade but a fundamental requirement for full participation in the contemporary ''Network Society' (Cardoso et al., 2025). As information flows become the lifeblood of the global political economy, the availability of robust digital infrastructure determines the capacity of nations and regions to compete and collaborate.

Beginning with the Digital Agenda for Europe in 2010, the EU set ambitious targets for member states, in an initial step ensuring basic broadband (at least 30 Mbps) access for all Europeans by 2020 (European Commission, 2010) and, later, established long-term goals for very high-capacity networks (VHCN), such as ubiquitous gigabit connectivity by 2030 (European Commission, 2022). While progress has been made, the interim targets proved challenging: by 2020, only Malta and Cyprus had achieved 100% coverage of 30 Mbps broadband, underscoring persistent digital divides between and within countries (DESI, 2020). Recognising that market forces alone were insufficient to meet these connectivity goals, EU institutions increasingly promoted State aid (public subsidies) as a policy instrument to spur broadband deployment in underserved areas.

While State aid aims to correct market failures in infrastructure provision, it is important to recognise that the digital divide is multidimensional. Reducing inequality in the network society requires addressing not only physical access to networks but also the disparity in basic skills and complex capabilities (Mendonça et al., 2015). Nevertheless, without the foundational layer of infrastructure (the focus of this thesis) neither skills nor advanced usage can be realised.

State aid for broadband involves public financing of network infrastructure under regulated conditions designed to avoid undue market distortions. Historically, EU competition policy treated state subsidies with caution, adhering to an ordoliberal principle that aid is generally incompatible with the internal market unless justified by objectives of common interest (Seidl & Lopes-Valença, 2024). However, the early 2000s marked a shift in perspective as the digital economy's importance grew and

private telecom operators proved reluctant to invest in high-cost rural or remote areas (Townsend et al., 2013). In 2003 the European Commission began actively assessing and approving broadband State aid measures on a case-by-case basis (Chirico & Gaál, 2014). By 2009, it issued dedicated Broadband State Aid Guidelines, which clarified the conditions under which public broadband subsidies are permissible (e.g. targeting 'white areas' with no existing networks, requiring technological neutrality and open access obligations) (European Commission, 2009). These guidelines (first adopted in 2009 and later revised in 2013 and 2023) signalled a growing acknowledgment that public intervention can play a legitimate role in achieving universal connectivity, provided competition safeguards are respected. It is important to note that the EU guidelines primarily addressed technical and economic criteria (network speeds, open access requirements, etc.) for allowable aid, rather than prescribing how Member States should govern or administer these programs. In line with the subsidiarity principle, the organisation and administration of broadband subsidy programmes is left to Member States' discretion, to be determined according to domestic institutional arrangements.

To support broadband expansion, the EU has also mobilised multiple funding mechanisms since 2007. These include the Structural and Investment Funds (e.g. ERDF, ESF, Cohesion Fund) and the Connecting Europe Facility, which together channelled approximately €15 billion toward broadband initiatives between 2014 and 2020 (ECA, 2018, p. 6). More recently, the EU's Recovery and Resilience Facility (part of the NextGenerationEU package) has prioritised broadband investments as critical for post-pandemic recovery and territorial cohesion (Neto et al., 2023). These funding commitments reflect a broad consensus that high-speed connectivity is a public good essential for both economic competitiveness and territorial cohesion.

Responsibility for designing and implementing broadband State aid programs lies with national and subnational governments. By the mid-2010s, most EU countries had introduced national broadband plans that set coverage targets aligned with EU objectives (OECD, 2018). These plans explicitly incorporate State aid measures to subsidise network roll-out in areas where private investment is lacking. However, the manner in which these subsidies are administered varies considerably across countries, often influenced by each country's administrative structure and policy legacies. In some cases, the central government takes primary charge, planning and executing broadband projects through a national ministry or agency. In others, decentralised models are adopted, where a national strategy exists but subnational authorities (regions, states, or municipalities) carry out significant portions of the deployment, reflecting a multi-level governance approach (Briglauer & Grajek, 2023; Gerli et al., 2023). Still other countries use hybrid approaches, launching both nationwide schemes and separate regional initiatives in parallel.

These diverse governance arrangements reflect a complex interplay of EU incentives, national administrative traditions, and subnational capacities. Federal or devolved systems (e.g. Germany, the

UK) typically involve regional and local authorities in implementation, while unitary states often exhibit more centralised approaches (e.g. Portugal). However, this pattern is not deterministic. For example, Spain's quasi-federal constitution might suggest significant regional involvement, yet its broadband State aid governance remained largely centralised (Feijóo et al., 2014). Conversely, France's formally unitary state undertook deliberate decentralisation reforms that enabled strong local initiatives in broadband deployment (Loridan-Baudrier, 2014). Thus, formal state structure alone does not determine governance outcomes; historical legacies, administrative capacity, and political choices are equally consequential. The involvement of subnational authorities in infrastructure policy also raises questions about institutional capacity and scale. As Teles (2016) notes, inter-municipal cooperation has emerged as a relevant mechanism for overcoming the fragmentation of local government in Portugal, potentially offering a governance scale more suitable for network industries than individual municipalities

As the EU has ramped up its broadband ambitions (toward ubiquitous gigabit-speed networks by 2030) and embraced new technologies such as 5G mobile networks, State aid interventions have become increasingly prominent. Policymakers recognise that without public subsidies, purely market-driven deployment will likely leave rural, remote, and economically disadvantaged areas behind in the digital transition. Indeed, by the early 2020s many Member States were planning new rounds of broadband State aid (including those co-financed through the RRF and other funds) to extend fibre-optic and 5G coverage into the hardest-to-reach areas (Neto et al., 2023). The literature on telecommunications economics and policy has highlighted the need to renew empirical approaches, by exploring new indicators and datasets to better understand the role of digital infrastructures and communication services in the contemporary economy (Mendonça et al., 2015). The literature also shows that the development of 5G rests on a dense institutional process involving standard-setting bodies, regulators, and large global operators, which reinforces the centrality of governance choices and public instruments supporting network infrastructure (Mendonça et al., 2022). The growing reliance on subsidy programs for high-speed network deployment brings important questions of public governance to the forefront: Who should administer these programs: central governments, local authorities, or some combination? How do different administrative arrangements impact the effectiveness and equity of broadband roll-out? And what institutional factors lead countries to favour one governance model over another? These questions situate this thesis at the intersection of EU public policy goals and domestic institutional contexts. While the EU's broadband policy provides common objectives and a supportive legal and financial framework, actual implementation 'on the ground' is mediated by the multi-level governance structures unique to each country. Understanding these structures is essential for evaluating how broadband expansion policies are executed in practice and for identifying potential improvements.

1.2. Research question

Despite shared EU targets and guidelines, countries have exhibited markedly different governance models in implementing broadband State aid measures. This variation raises a compelling research question: why have countries faced with similar EU objectives and guidelines adopted contrasting governance models for implementing state aid for broadband? In particular, what institutional factors (such as a country's governmental structure, administrative traditions, legal powers, and prior policy experiences) explain these divergent choices.

The existing literature offers only a partial explanation of this puzzle. Much prior research on broadband deployment policy has focused on economic outcomes and technical considerations, for example analysing the impact of broadband subsidies on private investment, competition, or service coverage (Briglauer & Grajek, 2023; Gerli et al., 2023). Other studies have quantified the efficiency of subsidies, the broadband penetration achieved, or the cost–benefit of various technologies (e.g. fibre optics vs. wireless) (Bourreau et al., 2023). However, such work tends to treat the implementation mechanism as a given background condition rather than a variable of interest. It rarely asks whether a program was centrally administered or locally driven, or how such governance arrangements might influence outcomes. This represents a significant gap in the literature: without understanding how and why governance models vary, policymakers cannot effectively calibrate aid interventions to different institutional contexts, and scholars lack a systematic explanation of how institutional legacies shape policy choices in Europeanised (EU-guided) but nationally administered domains. This thesis addresses that gap by examining the institutional determinants of governance model selection. In doing so, it contributes to public administration theory, provides empirical insight into multi-level governance in digital infrastructure policy, and offers practical guidance for policymakers designing effective, context-appropriate State aid measures.

Recent exploratory studies have hinted at the importance of governance arrangements. For example, an analysis by Gerli et al. (2023) found that broadband projects involving shared governance between national and regional authorities can improve aid effectiveness. However, they also identified obstacles (such as political coordination problems and variations in subnational capacity) that such arrangements face. This suggests that involving subnational authorities can be beneficial, yet it is not a guaranteed panacea; its success likely depends on specific institutional contexts. Another study by Bourreau et al. (2020), which aggregated 15 years of EU broadband State aid cases, highlighted significant differences in how countries structured their aid programs. While these contributions reinforce the idea that 'governance matters,' they do not systematically explain why one country's governance model differs from another's.

Against this backdrop, the central research question guiding this thesis is:

RQ: Which institutional factors influence the governance model of State aid measures for VHCN broadband deployment, particularly in terms of subnational authorities' participation in implementation?

In other words, why do some countries implement broadband State aid via decentralised, multi-level arrangements involving regional and/or local governments, while others rely on centralised models, and what historical or institutional factors drive these choices?

To address this overarching question comprehensively, the thesis investigates six complementary sub-questions, each corresponding to one of the empirical chapters:

SQ1 (Chapter 2): How has EU State aid governance evolved over time, and to what extent has this transformation created opportunity space for diverse national governance approaches to broadband deployment?

SQ2 (Chapter 3): What patterns of governance models (centralised or decentralised) can be identified across EU Member States' broadband State aid measures between 2003 and 2023?

SQ3 (Chapter 4): How do regulatory frameworks, market structures, deployment costs, and State aid governance interact to shape VHCN rollout outcomes in France, Portugal, Spain, and the United Kingdom?

SQ4 (Chapter 5): Through which historical institutionalist mechanisms (path dependence, critical junctures, and gradual institutional change) have France, Portugal, Spain, and the UK arrived at divergent governance models for broadband State aid?

SQ5 (Chapter 6): What explains the recentralisation of broadband governance in the UK after 2020, despite prior devolution reforms, and what does this reveal about the dynamics of institutional change and political incentives in multi-level systems?

SQ6 (Chapter 7): Do governance patterns observed in broadband State aid extend to contemporary EU multi-level industrial policy instruments such as Important Projects of Common European Interest (IPCEIs), and what are the distributional implications for core versus peripheral member states?

These sub-questions progressively build understanding: from the macro-institutional context (SQ1), through systematic mapping (SQ2), comparative analysis of regulatory and market conditions (SQ3), causal mechanisms of institutional development (SQ4), in-depth examination of institutional reversal (SQ5), to extension into adjacent policy domains (SQ6). Collectively, they enable a comprehensive answer to the central research question by illuminating both cross-national variation and temporal dynamics in State aid governance.

Figure 1.1. illustrates the hierarchical structure of the research and how each chapter progressively addresses complementary research sub-questions (SQ1-SQ6) that collectively answer the central research question.

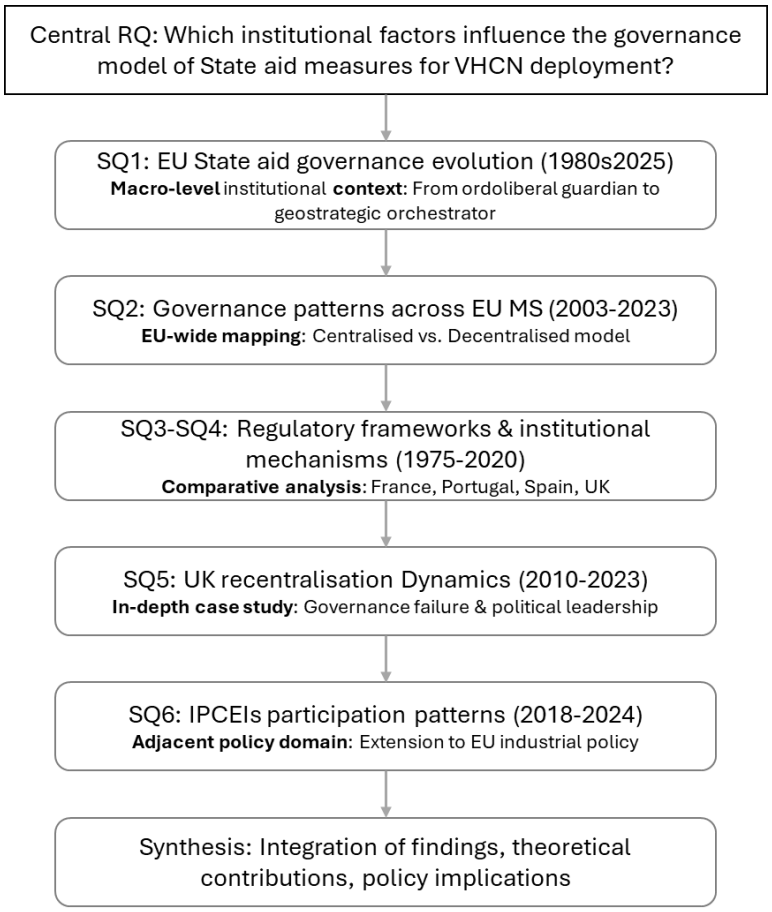


Figure 1.1. Thesis architecture and articulation of research sub-questions

Source: Author's elaboration

For the purposes of this research, the term 'governance model' refers to the configuration of decision-making and implementation responsibilities. This includes, for example, whether a broadband State aid measure is a single national scheme administered by the central government or an aggregation of independent regional projects, and who has autonomy in execution. 'Institutional factors' encompasses both formal structures (such as the territorial organisation of the state – unitary vs. federal – along with any constitutional provisions for regional autonomy or administrative decentralisation laws) and informal or historical elements (such as long-standing central-local relations, political traditions of centralisation or decentralisation, past policy precedents in infrastructure deployment, and norms of intergovernmental coordination). The explicit focus on the participation of subnational authorities reflects an important dimension of multi-level governance: whether local entities are passive recipients of a nationally determined policy or active partners in the design and execution of projects. This is not only a matter of efficiency or effectiveness, but also of democratic governance and regional equity, as subnational involvement can empower communities and tailor solutions to local needs (Pina-Sánchez, 2014).

In researching this question, the goal is not to normatively evaluate which model is 'better,' but rather to understand the determinants and evolution of these governance arrangements. Implicit is the hypothesis that differences in governance models are not random but rooted in deeper institutional contexts. For instance, a federal country with constitutionally strong state or regional governments is more likely to involve subnational authorities in broadband programs than a unitary country with a tradition of centralised planning. Yet there may be exceptions and complexities: a formally decentralised country might still centralise a particular policy due to political choices, or a unitary state might decentralise implementation for pragmatic reasons. A comprehensive, comparative approach is therefore needed to discern how various institutional factors (such as historical legacies, administrative capacities, constitutional constraints, and political incentives) combine to influence governance outcomes.

This research question is significant on multiple fronts. It highlights an underexplored area in public policy and administration scholarship: the interplay between institutional change and multi-level governance in the context of digital infrastructure policy. Its practical relevance stems from the fact that the effectiveness of broadband expansion efforts can depend on choosing a governance approach that fits a country's institutional reality. A mismatch between the governance model and a country's administrative capacities or traditions may result in implementation delays, under-utilisation of local knowledge, or coordination failures, whereas aligning the approach with institutional strengths (for example, leveraging strong municipal governments where they exist, or ensuring robust central oversight where local capacity is weak) can enhance policy outcomes. By identifying the institutional factors at play, the findings aim to inform policymakers on how to design State aid interventions that suit their governance context. For instance, whether introducing greater flexibility for subnational participation would be beneficial, or whether a more unified national approach is warranted under certain constraints. The thesis also contributes to broader debates on the decentralisation of public policies, a topic highlighted in national contexts such as Portugal (Adão e Silva, 2025).

The variation in how EU countries govern broadband State aid, despite facing similar external objectives, presents a kind of natural experiment in institutional influence. The focus on institutional factors and subnational participation provides a lens to examine this variation systematically. In the following sections, the theoretical frameworks that guide this inquiry are discussed, laying the groundwork for interpreting these governance differences through a structured analytical perspective.

1.3. Theoretical framework: historical institutionalism and multi-level governance

To examine the governance of broadband State aid measures and the institutional factors underlying it, this thesis adopts a dual theoretical lens. The primary framework is historical institutionalism (HI) (Hall & Taylor, 1996), complemented by insights from multi-level governance (MLG) theory (Bache & Flinders, 2004; Marks, 1993). Together, these approaches allow examination of the problem both in terms of temporal institutional development and the vertical distribution of authority in policymaking. In addition, other relevant public policy frameworks, such as policy feedback theory (Pierson, 1993; Skocpol, 1992) and punctuated equilibrium (Baumgartner & Jones, 1993; Krasner, 1984), are acknowledged for context, although they are not central to the analysis.

HI is one of the classical 'new institutionalist' (Hall & Taylor, 1996) approaches in political science, and it is particularly useful for understanding how past decisions and institutional configurations shape present policy choices. Institutions, in this view, comprise the formal and informal rules that structure political behaviour (Carney, 2020; Steinmo, 2001)[1]. HI directs our attention to temporal dynamics of policy development, namely to the notion that history matters in constraining or enabling future options (Hall & Taylor, 1996; Lowndes & Roberts, 2013; Peters, 2012). Three core concepts from HI inform this study: path dependence (Pierson, 2000), critical junctures (Capoccia & Kelemen, 2007; Pierson, 2004), and gradual institutional change (Mahoney & Thelen, 2010; Streeck & Thelen, 2005).

Path dependence explains how initial policy or institutional choices can set processes in motion that become self-reinforcing over time (Greener, 2005; Pierson, 2000). Once a country adopts a certain governance model (for example, a centralised approach to infrastructure provision), increasing returns and positive feedback mechanisms may 'lock in' that trajectory (Arthur, 1994; Pierson, 2000). For instance, a centralised broadband program could build up a specialised national agency, vested interests, and administrative routines geared toward central control, making it progressively harder to shift to a decentralised model later on. Pierson (2000) notes that as path dependence takes hold, the costs of switching paths grow over time due to institutional inertia and the adaptive expectations of actors. In our context, we explore whether countries with early experiences of either centralisation or decentralisation in telecommunications policy continued along those paths. For example, France's early delegation of telecom responsibilities to local authorities in the 1980s (Payen, 1987) created local capacities and expectations that reinforced a decentralised pattern in later broadband initiatives. Path dependence sensitises us to such continuity and the role of increasing returns, i.e. the more an

[1] Formal institutions are those which have been formally codified by an appropriate policy-making entity, often in writing; for example, in laws, regulations, organizational bylaws, or other forms of policy. Informal institutions are those that are learned through socialization or are tacitly understood and are reflected in widely accepted social practices or culturally tied habits (Siddiki, 2022).

approach is used, the more efficient and entrenched it becomes, thereby discouraging change. It also highlights positive feedback loops, whereby policies create constituencies or institutional commitments that advocate for the *status quo*.

Critical junctures are moments of significant change during which the normal constraints of path dependence are relaxed, allowing divergent developments to occur (Capoccia & Kelemen, 2007). Critical junctures often coincide with major political, economic, or technological shifts that force a rethinking of established arrangements. In telecommunications policy, examples might include the liberalisation of telecom markets in the 1980s-90s or the introduction of the EU Broadband State Aid Guidelines in 2009, events that posed new challenges and opened windows of opportunity for reform. Decisions made during a critical juncture can lead a country onto a new institutional path. For instance, the UK's devolution reforms in the late 1990s (a critical juncture in its territorial governance) created devolved administrations that later took on roles in broadband programs, shifting the UK toward a multi-level implementation model. HI scholars stress examining both the antecedent conditions leading up to a critical juncture (which shape what changes are possible) and the post-juncture 'reproduction' phase during which a new path becomes institutionalised (Mahoney, 2001, pp. 112-113; Slater & Simmons, 2010). In our cases, we identify potential critical junctures such as domestic decentralisation reforms (e.g. France's 1982 Defferre law, Spain's post-Franco devolution statutes) or EU-level shifts (like the advent of substantial EU funding for broadband in 2007) that may have set countries on different governance trajectories. For example, France's decentralisation wave in the 1980s can be seen as a critical juncture that enabled local governments to emerge as major actors in telecom infrastructure (Thatcher, 1999), whereas Portugal did not undergo a comparable decentralisation in telecom, a contrast that helps explain later differences. When analysing these moments, the HI approach suggests we should read history forward (Capoccia & Ziblatt, 2010, p. 939) by identifying the main decision-makers, the institutional alternatives that were viable at the time, and how the choices made during the critical juncture steered subsequent developments.

Not all institutional change happens via big shocks; often, institutions evolve incrementally through processes like layering, drift, conversion, and displacement (Mahoney & Thelen, 2010; Streeck & Thelen, 2005). These concepts capture how governance models might adjust over time without a single dramatic break. For instance, layering occurs when new elements are added onto existing structures, as when a national government introduces an option for regions to participate in a broadband scheme, thereby layering a decentralised element onto a previously centralised framework. Drift refers to institutions gradually becoming misaligned with their environment; for example, a country's laws might initially prevent municipalities from investing in broadband, which over time becomes a serious hindrance as technology evolves, unless the laws are updated. Conversion involves redeploying existing institutions for new purposes (for instance, a regional development

agency might take on the new task of managing broadband projects, converting its mandate from general infrastructure to digital infrastructure). Displacement is the removal or replacement of old rules with new ones, such as when a new legal framework for broadband State aid supersedes prior regulations. HI provides a toolkit for analysing these subtle shifts in each country's governance arrangements.

By applying HI concepts, this thesis traces each country's unique institutional trajectory, linking historical contexts to present governance outcomes. It prompts questions such as: Did a tradition of municipal ownership of utilities pave the way for municipal broadband (path dependence)? Did a major political shift enable a new governance approach (critical juncture)? Has a centralised model persisted simply due to inertia (lock-in), or did it adapt gradually through layering or drift? The answers to such questions help explain why a given governance model took hold in each case.

While HI addresses why and how governance models change (or persist) over time, MLG helps describe and interpret how authority is distributed across levels of government at any given time. MLG emerged from studies of EU integration (Marks, 1993) and refers to decision-making systems where authority is dispersed across multiple tiers of government – supranational, national, regional, and local – rather than concentrated at one level. In the context of broadband State aid, an MLG perspective draws attention to the fact that policy design and implementation often involve interactions between the European Commission (which sets State aid rules and co-funds projects), national governments (which design programs and finance them), and subnational governments (which may implement projects or contribute additional funding). Governance in the EU is inherently multi-tiered, making MLG a natural lens for this analysis.

Scholars distinguish between two broad types of MLG (Hooghe & Marks, 2003). Type I MLG refers to general-purpose jurisdictions like nation-states and regions that have relatively stable competencies (e.g. a federal system's division of powers). Type II MLG involves more flexible, task-specific jurisdictions (for example, specialised agencies or intergovernmental networks created to manage particular policy programs). The subject of this thesis primarily involves Type I structures (countries and their regional/municipal subdivisions), but there are elements of Type II when considering temporary or *ad-hoc* implementation bodies (such as a national broadband agency coordinating with local bodies).

An MLG lens prompts us to ask: To what extent is the governance of broadband State aid shared across levels versus concentrated at one level? For example, a strongly centralised model indicates low dispersion of authority (the national government dominates both decision and implementation), whereas a fully decentralised model indicates high dispersion (regional and/or local authorities have significant autonomy in implementation). Some countries also exhibit intermediate forms, such as co-governance, where national and subnational entities formally collaborate in implementation (Fenwick

et al., 2012). In many cases, inter-municipal cooperation serves as a 'meso-level' coordination mechanism within an MLG system, enabling joint project delivery across neighbouring municipalities while preserving local autonomy (Teles, 2016; Teles & Swianiewicz, 2018). MLG scholarship often examines the effectiveness and democratic legitimacy of different allocations of authority, highlighting potential trade-offs: centralisation can ensure uniform standards and strategic coherence, while decentralisation can enhance local responsiveness and innovation (Liesbet & Gary, 2003; Scharpf, 2009). These normative considerations form part of the background motivation for studying governance choices: the tension between uniformity and flexibility is a recurring theme, where centralised approaches promise economies of scale and equal service, whereas decentralised approaches promise better tailoring to local needs and greater stakeholder buy-in.

At the same time, multi-level arrangements introduce complexity. As Gerli et al. (2023) caution, involving multiple government levels can lead to political misalignment or unclear divisions of responsibility, which may hinder policy delivery. MLG theory by itself does not explain how a particular distribution of authority came about in each country. That is where HI provides a complementary explanation by 'adding' the time dimension. What MLG does provide is a vocabulary to classify and compare our cases in terms of governance structure at the point of broadband policy implementation.

In applying an MLG perspective, this thesis also accounts for the EU's supranational influence. Although our primary focus is the national-subnational relationship, the EU's role (through funding rules and regulatory oversight) means that broadband State aid governance in Europe is inherently multi-layered. One could describe the situation as a case of 'nested' MLG, where subnational-national relationships exist within an overarching EU-national governance framework. For example, the European Commission's State aid approval processes and co-financing conditions can influence how Member States design their programs, indirectly shaping national governance arrangements. Our analysis considers these dynamics: how EU-level frameworks create incentives or constraints that condition national choices.

Beyond HI and MLG, it is worth briefly noting how other theoretical perspectives could provide alternative angles on this topic, even if they are not the primary lenses used. Policy feedback theory (Pierson, 1993; Skocpol, 1992) emphasises how policies, once enacted, can restructure politics by creating new interest groups, changing public expectations, or altering resource distributions. In our context, one might ask whether early broadband policies or other infrastructure interventions generated feedback effects that made certain governance models more viable over time. For example, if pilot broadband projects led by local governments were particularly successful and popular, that positive feedback might strengthen the case for a decentralised approach in subsequent policies. Conversely, if a centrally run project failed or encountered public resistance, that negative feedback might open the door for a more decentralised model next. While our analysis centres on antecedent

institutions more than on policy feedback, we do note instances where feedback dynamics appear to have played a role (for instance, early municipal broadband initiatives that galvanised local political support for continued devolution in telecom governance).

Punctuated equilibrium theory (Baumgartner & Jones, 1993; Krasner, 1984) posits that policy change is characterised by long periods of stability (equilibrium) punctuated by brief periods of rapid change, often triggered by shifts in attention, framing, or political venue. One could interpret the introduction of a new governance model (say, a sudden decentralisation of broadband policy following years of central control) as an example of such a punctuation. This perspective aligns in part with the HI notion of critical junctures but places more emphasis on issue framing and policy subsystems (Baumgartner & Jones, 1993, p. 6). In the broadband State aid context, a punctuated equilibrium viewpoint might highlight how a focusing event (e.g. a highly publicised market failure in rural broadband, or a change of government with a new ideology) quickly shifted the governance approach. Although we do not explicitly apply punctuated equilibrium theory, we acknowledge that some changes in our cases were abrupt while others were incremental, an observation consistent with both HI (via critical junctures) and punctuated models of change.

In conclusion, HI provides the foundation for our theoretical approach, allowing us to trace and explain the development of governance models over time and to understand how past institutional contexts (e.g. legacies of centralisation or decentralisation, or critical reforms) shape current policy governance. MLG complements this by framing the analysis of current governance structures in terms of the dispersion of authority across levels and the interactions between those levels. Together, these lenses help us move beyond merely describing 'who does what' in broadband policy towards explaining 'how it came to be that way' and 'why it matters' for public governance in a multi-tiered setting. This theoretical foundation sets the stage for the research design and methodology, which are outlined next, before the thesis proceeds to the empirical analyses.

1.4. Research strategy and methodology

To address the research question, the thesis employs a comparative case study strategy underpinned by qualitative methods, specifically, process tracing and content analysis. The research design is nested and multi-method: it combines a broad investigation of all EU Member States' broadband State aid governance (Chapter 3) with in-depth historical case studies of four countries (Chapters 4, 5, and 6). This approach provides both breadth and depth, ensuring a detailed causal understanding within specific national contexts while also situating those cases in a wider European panorama.

1.4.1. Comparative case selection

The thesis focuses on a four-country comparative study: France, Spain, Portugal, and the UK. Methodologically, this design aligns with a Most Different Systems Design (MDSD) (Anckar, 2008; Przeworski & Teune, 1970). These four countries differ markedly in size, state structure, and political history, yet they face a similar policy challenge (broadband gaps and the use of State aid to address them) and have, in broad terms, arrived at one of two outcomes (centralised or decentralised governance of broadband aid). The puzzle lies in how countries with such different starting conditions sometimes converge on similar governance arrangements (or diverge as expected). This design allows us to examine whether common mechanisms (path dependence, critical junctures, gradual change) operate across very different contexts, as well as to identify unique factors that explain why one country might differ from another.

France and the UK represent cases that evolved toward decentralised governance models, involving subnational authorities extensively in broadband State aid implementation. In contrast, Portugal and Spain have largely retained centralised governance models, with national authorities dominating implementation. This pairing also captures interesting variation in formal state structures: the UK is a union state with devolved governments, France is a unitary state that underwent significant decentralisation reforms, Spain is a quasi-federal system with autonomous communities, and Portugal is a unitary state with only limited regional autonomy. All four are Western/Southern European countries that faced the same EU Digital Agenda targets and had access to EU funds for broadband, which holds constant certain external influences. By comparing these cases, we can observe how different institutional configurations correlate with different governance outcomes, and we can examine the historical processes that led each country down its respective path.

1.4.2. Process tracing

For each of the four in-depth country cases, process tracing is used to uncover the sequence of events, decisions, and institutional changes that influenced the chosen governance model for broadband State aid. Process tracing is well-suited to historical institutional analysis, as it allows the identification of critical junctures, key decisions, and gradual changes within each case (Bennett & Checkel, 2014; Collier, 2011). In practical terms, this involved constructing a narrative timeline for each country, beginning from the 1970s (or earlier where relevant) through the 2010s, focusing on milestones in telecommunications policy, public administration reforms, and broadband initiatives. These narratives help identify when and why any shifts in governance occurred. For example, did Spain ever consider a more decentralised model and then reverse course? Did the UK always involve local authorities or was there a turning point when that changed? By employing process tracing, we can connect such dots and test hypotheses about causal mechanisms, for instance, whether a decentralisation law led to local

involvement in broadband (evidence: after the law's passage, municipalities started projects they previously could not, indicating a causal link), or whether EU funding criteria prompted a governance change (evidence: a requirement for regional partnership in fund applications that encouraged a multi-level approach).

1.4.3. Data sources

The thesis relies on multiple, complementary sources of evidence that operate at different levels of analysis, from EU-wide regulatory practice to country-specific policy trajectories and firm-level project participation. This multi-layered data strategy is designed to match the nested research design and to allow for systematic triangulation between legal texts, administrative decisions, and secondary interpretations.

A first pillar of the empirical work is a structured database of European Commission State aid decisions on broadband deployment. For Chapter 3, all relevant cases were extracted from the Commission's competition case database, yielding 199 decision letters adopted between 2003 and 2023, of which 122 correspond to original measures directly supporting broadband network deployment. These decisions provide the governance arrangements for the design and implementation of each measure. They constitute the backbone for identifying and coding governance models across Member States, and for relating these models to broader institutional characteristics such as state structure or regional authority.

A second pillar consists of national legal and policy documents that anchor the country case studies developed in Chapters 4, 5, and 6. These include constitutional provisions and organic laws on territorial organisation and decentralisation, telecommunications and electronic communications legislation, national broadband plans, implementing regulations, governmental strategies, and parliamentary debates. Such documents make it possible to trace reforms in territorial governance, sectoral regulation, and broadband policy over time, thereby operationalising the historical institutionalist focus on path dependence, critical junctures, and gradual change. They also clarify the formal distribution of competences between central and subnational authorities in fields such as economic development, infrastructure, and digital policy, which is essential for interpreting observed governance models.

A third pillar involves a systematic engagement with secondary literature and evaluative reports. This corpus includes academic work on EU State aid governance (used in Chapter 2), empirical studies of broadband State aid and deployment (mobilised in Chapters 3-5), and analyses of UK broadband policy, governance failures, and recentralisation (central to Chapter 6). It also covers reports from the European Court of Auditors, national audit institutions, regulators, and international organisations that assess the performance, effectiveness, and territorial impacts of broadband and digital infrastructure

programmes. These sources provide both conceptual guidance and independent empirical assessments that help validate and contextualise the interpretations derived from primary documents.

Finally, Chapter 7 draws on a purpose-built dataset on participation in Important Projects of Common European Interest (IPCEIs). This database was constructed from publicly available Commission decisions, national announcements, and project documentation, and records participating firms, home countries, project waves, sectors, and, where possible, financial commitments. Combining this information with standard indicators of national economic size and capacity allows for a systematic examination of the geography of IPCEI participation and of the distributive patterns embedded in this new instrument of EU industrial policy. In doing so, the thesis extends the governance and inequality concerns developed for broadband State aid to a wider universe of high-tech, state-supported investment.

Across all chapters, these sources are analysed using document-based qualitative methods content analysis and process tracing and, where applicable, basic descriptive statistics. The reliance on official decisions, legal texts, and published evaluations is consistent with the thesis's focus on formal institutions and governance arrangements, while the cross-referencing of sources at EU, national, and project levels reinforces the robustness and credibility of the empirical findings.

1.5. Structure of the thesis

This thesis follows a qualitative, comparative inquiry presented as a series of complementary studies (a compilation of journal articles) that collectively build toward answering the central research question. The structure of the work is akin to a nested analysis: it moves from broader contextual and theoretical exploration to focused comparative case analysis. The intent is to ground the detailed country-level investigations in a solid understanding of the wider policy landscape and scholarly debates.

The chapters progress in a logical sequence to deepen understanding of broadband State aid governance. Chapter 2 traces the macro-level evolution of EU State aid policy and its governance, establishing the broader institutional context that enables or constrains national governance choices. Chapter 3 provides a comprehensive mapping of broadband State aid governance models across the EU-27, using European Commission decision data (2003-2023) to identify patterns and to hypothesise institutional determinants of those patterns. Chapters 4 and 5 then offer detailed comparative analyses of France, Portugal, Spain, and the UK. Chapter 4 examines each country's regulatory environment and market dynamics, setting the stage by showing how sectoral conditions and national policy environments interact with State aid governance choices. Chapter 5 uses comparative historical analysis (including process tracing) to demonstrate how path dependencies, critical junctures, and

gradual institutional changes have led to divergent governance trajectories in the four countries. Chapter 6 focuses on the UK in greater depth, illustrating how governance arrangements can shift (in this case, recentralise) in response to performance feedback and political leadership incentives. Chapter 7 extends the inquiry to the EU level by examining Important Projects of Common European Interest (IPCEIs) as a test case for contemporary multi-level industrial policy coordination, and it explores how similar centralisation/decentralisation dynamics play out in these large-scale, cross-border initiatives. Finally, Chapter 8 (the conclusion) synthesises the findings, reflects on their theoretical and practical implications, and identifies directions for future research. The architecture of the deliverables of this project follows the logic of contributions produced for publication in academic journals. Chapters 2 to 7 correspond to either published articles or manuscripts submitted for publication:

Chapter 2: Manica, L., Damásio, B., and Mendonça, S. From ordoliberal guardian to geostrategic orchestrator: the transformation of EU State aid governance. (Manuscript submitted to Administration & Society on 1 December 2025).

Chapter 3: Manica, L., Damásio, B., and Mendonça, S. (2024). State aid for broadband network deployment: National and subnational governance mechanisms, 2003-2023. *Telecommunications Policy*, 48(9), 102837. DOI: 10.1016/j.telpol.2024.102837.

Chapter 4: Manica, L. (2025). Contrasting approaches to very high capacity network regulation and policy: a comparative analysis of France, Portugal, Spain and the UK (2008-2020). *Digital Policy, Regulation and Governance*, 27(1), 17–36. DOI: 10.1108/DPRG-07-2023-0111.

Chapter 5: Manica, L., Damásio, B., and Mendonça, S. (2025). Institutional legacies and governance models: A comparative study of broadband State aid in Europe. *Politics & Policy*, 53(5), e70069. DOI: 10.1111/polp.70069.

Chapter 6: Manica, L., Damásio, B., and Mendonça, S. Taking back control? Governance failure, political leadership and the centralisation of UK broadband policy. (Manuscript submitted to *European Policy Analysis,* on 20 October 2025).

Chapter 7: Manica, L., Damásio, B., and Mendonça, S. Strategic industrial policy in the European Union: The uneven geography of Important Projects of Common European Interest (IPCEIs) participation. (Manuscript submitted to New Political Economy on 4 December 2025).

Table 1.1 (below) provides key metrics for the journals in which these articles were published or to which they were submitted.

Table 1.1. Key metrics of the journals in which the articles were published or submitted

Journal name	CiteScore	Highest percentile	Quartile	Impact Factor	SJR	Publisher
Telecommunications Policy	11.9	97% 8/287 Library and Information Sciences	Q1	6.4	1.728	Elsevier
New Political Economy	9.4	98% 12/738 Political Science and International Relations	Q1	4.6	2.182	Taylor & Francis
European Policy Analysis	7.2	95% 12/738 Political Science and International Relations	Q1	2.9	0.871	John Wiley & Sons
Administration & Society	5.5	88% 179/1497 Sociology and Political Science	Q1	2.3	1.082	SAGE
Digital Policy, Regulation and Governance	5.3	71% 55/190 Information Systems and Management	Q2	2.7	0.528	Emerald Publishing
Politics and Policy	2.7	74% 12/738 Political Science and International Relations	Q2	1.5	0.412	John Wiley & Sons

Source: Scopus (accessed on 31 November 2025) and the websites of the journals.

1.6. Scientific contributions and relevance to public policy scholarship

This thesis makes several contributions to public policy and administration scholarship.

First, it advances knowledge in the field of State aid policy and regulation, a domain typically dominated by legal and economic analysis, by introducing a governance and public administration perspective. In shifting the focus from 'is aid allowed and does it work economically?' to 'how aid is implemented and governed,' the research bridges a gap and raises new questions about how governance choices influence policy effectiveness. As highlighted in the literature review, few studies have examined the institutional aspects of State aid interventions in depth, so this thesis enriches the discussion by incorporating governance concepts into State aid analysis

Second, it contributes to the literature on infrastructure policy and the digital divide by examining how different governance approaches may affect the pursuit of universal service objectives. In comparative perspective, the thesis shows that even in a highly Europeanised policy area, domestic institutional variation yields different policy instruments and potentially different outcomes. This underscores the enduring importance of national public administration features in an age of European integration and globalisation.

Third, it addresses debates on MLG and decentralisation by providing empirical evidence on the benefits and trade-offs of decentralising implementation in a complex policy area. Broadband policy serves here as a case study for bridging future research on the classic public administration question of what tasks are best handled by central versus local authorities. The findings align with broader

scholarship on federalism, devolution, and administrative reform by illustrating how centralisation and decentralisation affect policy delivery.

Methodologically, the thesis demonstrates the value of integrating qualitative and quantitative evidence in policy research. The combination of a quantitative EU-level mapping with in-depth qualitative case studies provides a model for other comparative analyses. It also shows how HI can be applied in a sectoral policy study, contributing to methodological discussions on tracing institutional influence in policy outcomes.

Finally, the thesis addresses current policy debates. As of the mid-2020s, the EU and its members are investing heavily in digital infrastructure (via recovery funds and industrial policy), and questions persist about the best governance arrangements for these investments. The analysis here suggests that one-size-fits-all governance models are unlikely to succeed because institutional capacities differ across countries. Instead, an adaptive governance approach is needed: policy interventions should be designed flexibly to be implemented either centrally or locally depending on context. Such flexibility can reconcile central objectives with decentralised execution, preventing fragmentation while accommodating diverse local needs.

1.7. Evolution of the research trajectory

Doctoral research is rarely a linear process. It is an iterative journey where initial hypotheses and designs are continuously tested against emerging data, theoretical awareness, and the realities of academic publication. The final structure of this thesis reflects this dynamic evolution, expanding beyond the scope initially foreseen in the research proposal to offer a more robust and comprehensive analysis of State aid governance.

The original research design anticipated the development of three core articles: (i) a systematic literature review on State aid from a public policy perspective; (ii) an analysis of governance models and power distribution in VHCN implementation; and (iii) a study of policy drivers in France, Portugal, Spain, and the UK. While these three pillars remain the foundation of the thesis, their execution evolved significantly to enhance their theoretical contribution and empirical relevance.

The first major evolution concerns Chapter 2. The initial intention to produce a standard systematic literature review was re-evaluated. It became evident that a purely descriptive review would struggle to offer the necessary conceptual novelty required for high-impact academic journals. Consequently, the work transitioned from a survey of how public policy views State aid to a deeper theoretical analysis of how the European Commission itself has evolved. The resulting chapter traces the transformation of the EU's State aid regime, from an 'ordoliberal guardian' to a 'geostrategic orchestrator' and explores how the Commission has adapted its governance models in response to

broader shifts in state paradigms. This provides a much stronger theoretical framework for the subsequent empirical chapters, while also contextualising two of the thesis's core concepts (State aid and governance).

The original second and third planned articles were fully developed and constitute the empirical core of the thesis. Chapter 3 (corresponding to the original second article) maps the governance models across the EU, establishing the critical distinction between centralized and decentralized implementation. Chapter 5 (corresponding to the original third article) applies Historical Institutionalism to explain the deep-seated policy drivers in the four case-study countries.

However, the depth of the comparative investigation necessitated three additional, unplanned contributions. Chapter 4 emerged from the preparatory research phase. As the regulatory and institutional contexts of France, Portugal, Spain, and the UK were being mapped to justify their selection as case studies, the richness of the data revealed that these contextual factors were relevant variables in their own right. This chapter was thus developed to rigorously document the similarities and differences in regulatory incentives and market dynamics, providing the necessary institutional baseline for the subsequent analysis of State aid.

Furthermore, Chapter 6 was born from the need to remain empirically responsive. During the investigation, the UK underwent a significant policy shift with the launch of 'Project Gigabit,' representing a stark recentralisation of competence that contradicted the devolutionary trends observed earlier. Ignoring this shift would have rendered the analysis incomplete. This chapter was therefore added to analyse governance failure and political leadership, illustrating that governance models are not static and can be reversed when political incentives change.

Finally, Chapter 7 closes the loop opened by the theoretical framework in Chapter 2. Throughout the investigation, a recurrent theme emerged linking State aid to broader industrial policy. As the EU moves towards a geostrategic stance, governance is expanding beyond the vertical (national-subnational) axis to a horizontal, supranational dimension. This final substantive chapter examines Important Projects of Common European Interest (IPCEIs), anticipating the future of State aid governance: a model that is increasingly collaborative, transnational, and focused on strategic industrial sovereignty beyond simple broadband connectivity.

While the thesis remains faithful to its original objectives, its expanded structure provides a more consistent, flexible, and forward-looking understanding of how states and the EU govern the funding of this networked infrastructure.

Note

The referencing style (APA, Harvard, or other) and the variant of English (American or British) used in each article have been preserved as in the original publications or manuscripts. Only the numbering of chapters, sections, figures, and tables has been adjusted to maintain a consistent thesis structure.

CHAPTER 2

From ordoliberal guardian to geostrategic orchestrator: the transformation of EU State aid governance

Abstract

This article conceptualizes the evolution of European Union State aid policy amid economic pressures, societal challenges and geopolitical imperatives. This contribution develops a two-dimensional typology that distinguishes ideational State models (ordoliberal, controlled dirigiste, geostrategic) from institutional governance modes (hierarchical, negotiated coordination, multi-level orchestration). The analysis clarifies how the European Commission adjusts governance modes to prevailing state models: moving beyond its initial ordoliberal guardian configuration, the regime has progressively transformed into an embedded facilitator and, more recently, assumed the role of a geostrategic orchestrator. The shift towards a geostrategic orchestrator enhances industrial capacity but raises distributional and accountability concerns, calling for stronger EU-level coordination and democratic oversight.

Keywords: State aid; EU industrial policy; IPCEI (Important Project of Common European Interest); strategic autonomy; European integration

2.1. Introduction

The European Union's (EU) State aid policy has long embodied one of the most fundamental tensions in political economy: the relationship between market discipline and strategic economic governance (Clift, 2013; Warlouzet, 2019). Originally designed to preserve undistorted competition within the single market, the Treaty of Rome and subsequent revisions framework establishes a general prohibition on State aid while delegating enforcement authority to the European Commission (Bacon, 2017; Finke, 2021). This approach, deeply rooted in the German *Soziale Marktwirtschaft* tradition, positioned the Commission as a supranational referee tasked with dissuading and scrutinizing national subsidies, blocking distortive measures, and demanding repayment of illegal aid (Hasse, 2017; Warlouzet, 2019). For decades, this competition-centric regime effectively constrained Member States' capacity for industrial intervention, reflecting "negative integration" (Scharpf, 1999).

In recent years, however, this model has come under increasing strain. A succession of systemic shocks (from the financial crisis and the COVID-19 pandemic to security-related supply chain

vulnerabilities and the energy crisis triggered by Russia's invasion of Ukraine) has fundamentally challenged the sustainability of a purely market-disciplinary approach (Bremer et al., 2023; Seidl & Schmitz, 2023). Simultaneously, intensifying global competition, particularly the resurgence of state-led industrial policies in China and the United States' assertive subsidization of strategic sectors, has forced European policymakers to reconsider the adequacy of purely market-based governance in an era of geoeconomic competition (Gertz & Evers, 2020).

Under President von der Leyen's self-proclaimed "Geopolitical Commission," concepts like strategic autonomy, technological sovereignty, and industrial resilience have become central priorities since 2019 (Haroche, 2023; Khan & Brunsden, 2019; McNamara, 2023). The short-term shocks and the long-term threats yielded an opportunity to re-set the agenda.

This transformation has manifested in remarkable policy innovations that would have been unthinkable under the original regime. The Commission has temporarily suspended State aid constraints during multiple crises, operationalized dormant Treaty provisions such as Important Projects of Common European Interest (IPCEIs) to support cross-border strategic investments, and proposed legislation like the EU Chips Act that prioritizes industrial capacity over pure competition concerns (Ferri, 2021; Seidl & Lopes-Valença, 2025). These shifts have occurred without formal Treaty amendment, indicating a flexible reinterpretation of existing legal frameworks that raises profound questions about institutional continuity and democratic accountability (Schmidt, 2020).

Despite these developments, existing scholarship remains fragmented and has yet to produce a coherent explanatory framework for the transformation of EU State aid policy into a tool of EU industrial policy. Three main shortcomings result from the current literature. First, much of the literature portrays policy evolution as ad hoc reactions to external shocks, underestimating the ideational coherence and institutional mechanisms that allow substantial change without formal rule revisions (Ferri, 2021; Meunier & Mickus, 2020). Second, legal- and policy-focused studies provide detail but generally lack theoretical grounding to account for both continuity and change, instead examining specific instruments or individual crises in isolation (Bacon, 2017; Gierow, 2025). Third, despite extensive theoretical work on the co-evolution of ideas and institutions, insufficient attention has been given to the interaction between ideational shifts about the state's economic role and adaptations of the institutional mechanisms that implement policy decisions (Campbell, 1998; Hall, 1993; Schmidt, 2008). This leaves us without an explanation of how new policy orientations and new governance mechanisms have jointly reshaped EU State aid.

This article addresses this gap by asking: How has the governance of EU State aid evolved in response to shifting conceptions of the state's economic role, and what does this transformation reveal about the changing nature of European economic governance? To answer this research question, the article develops an analytical framework that distinguishes between two interconnected dimensions

of policy change: state models (ideational orientations about the legitimate scope and methods of state economic intervention) and governance modes (institutional mechanisms through which policy decisions are coordinated and implemented). Drawing from comparative political economy, new institutionalism, and governance theory (Hall & Soskice, 2001; Hooghe & Marks, 2001; Schmidt, 2009), this article argues that these dimensions operate at different analytical levels and exhibit relative autonomy even as they co-evolve in practice.

The central theoretical contribution of this article lies in proposing a two-dimensional typology of EU State aid regimes that integrates ideational and institutional perspectives often studied separately. Based on a comprehensive mapping of the literature on State aid and industrial policy, three ideal-typical configurations are identified: the ordoliberal guardian regime (ordoliberal state model paired with hierarchical governance mode), the embedded facilitator regime (controlled dirigiste state model paired with negotiated coordination mode), and the geostrategic orchestrator regime (geostrategic state model paired with multi-level orchestration mode). This typology demonstrates how shifts in political economy doctrine have co-evolved with changes in EU governance style, revealing the politicization of what was once considered a purely technocratic policy domain. Figure 2.1 summarizes the two-dimensional typology of State aid regimes, illustrating how each ideal type aligns an ideational state model with a governance mode.

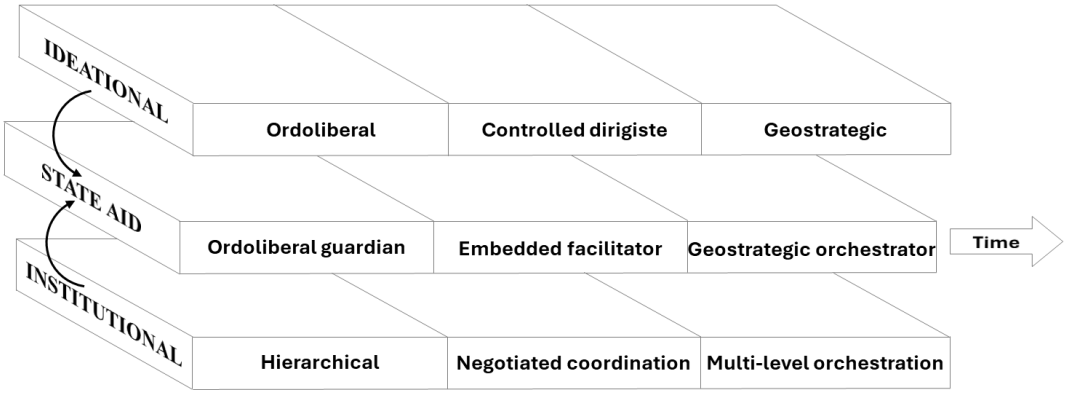


Figure 2.1. Ideational and institutional planes contributing to the configuration of EU State aid regimes.

Source: Authors' elaboration

Based on this framework, the article proceeds in four main sections. Section 2.2 develops the analytical framework, explicating the distinction between state models and governance modes and how they relate within EU State aid policy. Section 2.3 describes the methods and empirical data. Section 2.4 applies this framework to analyse the evolution through three successive regimes, illustrating each phase with representative policy developments and institutional innovations. Section 2.5 brings the analysis together by examining how evolving conceptions of the state's economic role and changing governance mechanisms have co-evolved over time, offering a coherent interpretation

of their interaction and implications for the transformation of EU economic governance. The Conclusion synthesizes the findings and reflects on their implications for understanding contemporary European political economy and the future of EU governance.

2.2. Theoretical framework: state models and governance modes

State models refer to prevailing belief systems about the scope, purpose, and methods of state intervention in the economy (Hall, 1993). They provide the normative foundation for economic governance decisions and embody assumptions about market efficiency, state capacity, and the balance between political and economic logics (North, 1990). State models connect directly to institutional theory in public administration, particularly the ideational dimension of institutions emphasized by historical institutionalism (Campbell, 1998; Schmidt, 2008). They represent what Schmidt (2008) calls cognitive and normative ideas, that is, shared understandings of how the economy works and normative beliefs about how it should work. These ideational frameworks configure institutional development by providing roadmaps for action and legitimating particular governance arrangements over others. Following a discursive institutionalist perspective, shifts in state models are understood not just as abstract paradigms but as narratives advanced by policy actors, gaining legitimacy as they are institutionalized in practice (Schmidt, 2008). Three ideal types of state models can be identified. The ordoliberal model, rooted in German postwar thought, sees the state as a regulator ensuring competition, preventing rent-seeking, and protecting markets from political interference (Böhm, 1989). Strict State aid control avoids subsidy races and secures market-driven outcomes, exemplifying the EU's early competition framework (Schmidt & Thatcher, 2013; Warlouzet, 2019). By contrast, the controlled dirigiste model, linked to French industrial policy, views the state as a legitimate agent of development and coordination (Clift, 2008; Levy, 2008). Public intervention, including subsidies and planning, is expected to foster innovation and structural transformation. From this perspective, EU State aid rules have often been criticized as too restrictive on national developmental ambitions, constraining what Amsden (1989) and Wade (1990) identify as essential tools of late industrialization. The controlled dirigiste model also reflects what Ruggie (1982) termed the embedded liberalism compromise (balancing market openness with domestic intervention) and embodies a neo-Keynesian (or "ordo-Keynesian") logic that legitimizes state guidance of the economy alongside market forces. More recently, a geostrategic model has emerged, reframing aid as an essential tool for European sovereignty and technological leadership amid global power competition (Di Carlo & Schmitz, 2023; Seidl & Schmitz, 2023). Subsidies are justified as collective investments in strategic industries to reduce dependence on foreign powers (Baldwin, 2016; Farrell & Newman, 2019). This emerging paradigm is consistent with the EU's current discourse on technological

sovereignty, which some describe as a "geo-dirigiste" shift in industrial policy, emphasizing supranational strategic autonomy (Haroche, 2023; Seidl & Schmitz, 2023). These state models are ideal types; in practice, EU policy has reflected elements of each at different times, often in hybrid forms.

Governance modes are the institutional arrangements and coordination mechanisms through which policies are made, implemented, and monitored across government levels (Hooghe & Marks, 2001; Majone, 1994). They define how authority is distributed, how decisions are taken, and how compliance is ensured within a multi-level system (Marks et al., 1996). Three stylized modes can be identified along a spectrum ranging from hierarchy to network, each addressing collective action in a multi-level polity. The hierarchical mode relies on top-down, rule-based enforcement, with the Commission acting as a regulatory authority unilaterally reviewing aid measures (Majone, 1994). It reflects Weberian bureaucracy (legal-rational authority, formal procedures, and hierarchy) and Williamson's (1985) notion of hierarchy, where coordination rests on command-and-control. The negotiated coordination mode emphasizes joint decision-making and flexibility, using guidelines, consultations, and conditional approvals to steer aid toward shared objectives rather than simply prohibiting or approving aid (Eberlein & Kerwer, 2004). This represents a move toward network-based coordination founded on reciprocity and mutual adjustment instead of strict hierarchy (Powell, 1990). Finally, a multi-level orchestration mode entails a more decentralized yet coordinated form of governance, wherein authority is distributed across EU and national levels in a network-like fashion (Hooghe & Marks, 2001; Bache & Flinders, 2004). In this mode, the Commission acts as an "orchestrator" in a metagovernance system, setting objectives and facilitating cooperation among a range of public and private actors (Abbott et al., 2015; Sørensen & Torfing, 2009). This approach corresponds to indirect governance "through intermediaries" in which the central authority steers networks via guidance and incentives rather than direct orders.

2.3. Methods and sources

This study adopts a qualitative and interpretive approach. The analytical framework is constructed through structured engagement with relevant literature across comparative political economy, European integration studies, and governance theory, and each regime type is illustrated with key policy developments (e.g., crisis-era aid frameworks, major legislative initiatives, IPCEI projects) that exemplify its distinctive characteristics. Following an appreciative theorising stance (Nelson & Winter, 1982), the analysis does not seek formal modelling but rather remains closely aligned with the evolution of the phenomena under study, providing interpretation and conceptual guidance as these dynamics unfold over time. By qualitatively analysing both academic studies and EU policy documents, the co-evolution of ideational shifts and institutional innovations over time is traced.

To analyse the evolution of EU State aid policy and scholarly interpretations thereof, we conducted a comprehensive literature mapping. The objective was to identify peer-reviewed academic works that explicitly examine the interaction between EU State aid control and industrial policy. The search, conducted on 13 May 2025 (to get the full year 2024 and a more stable database), focused on English-language peer-reviewed publications indexed in the Scopus database, using the query: ['European Commission' *OR* EC *OR* 'European Union' *OR* EU] *AND* ['State aid']. We excluded purely doctrinal legal or technical economic studies unless they also addressed policy or political implications. From an initial pool of 820 records, 64 publications were selected based on abstract relevance. After full-text screening, 30 were excluded, resulting in a core set of 34 studies. An additional 32 references were identified through snowball sampling based on contextual relevance (e.g., cited in the core literature or key policy documents), of which 14 were retained following full-text analysis. The final dataset comprises 48 academic works.

In addition to peer-reviewed scholarship, we systematically incorporated anchor policy initiatives and landmark reports across all phases of EU State aid governance. For the market-integration phase, we draw on the Cecchini Report on the "cost of non-Europe" and Single Market programme (1988/1989), the Delors growth and competitiveness agenda (notably the 1993 White Paper), and subsequent internal market scoreboards and soft-law guidance. For the modernisation turn of the mid-2000s-2010s, we cover the Lisbon Strategy (2000), the State Aid Action Plan (SAAP, 2005), successive General Block Exemption Regulation (GBER) revisions (2008, 2014, later expansions), and State Aid Modernisation (SAM, 2012-14), alongside the IPCEI framework/Communications that enabled cross-border projects. For the post-2020 geostrategic reorientation, we integrate the Temporary Frameworks (2008 financial crisis; COVID-19 in 2020; energy/Ukraine shock in 2022), the Green Deal Industrial Plan (2023) and its targeted relaxations of aid rules for clean-tech, the EU Chips Act (2023) allowing 'first-of-a-kind' semiconductor support, and broader instruments such as NextGenerationEU. We also consider high-level strategy reports by Enrico Letta (2024) and Mario Draghi (2024), which advocate for large-scale coordinated investment and reframe State aid as a key instrument of industrial sovereignty. These representative examples are intended to be illustrative rather than exhaustive. Our goal is to develop a conceptual explanatory framework; we do not attempt a complete empirical mapping of all State aid activity. The approach is interpretive and historical, aiming to show how evolving ideas and institutions co-evolved, rather than to measure causal effects quantitatively. Table 2.1 summarizes the most relevant policy documents used.

Table 2.1. Major milestones in the evolution of EU State aid governance (1988-2024)

Year	Event / policy initiative	Significance for State aid and EU economic governance
1988	Cecchini Report – The European Challenge 1992	Quantified the benefits of the Single Market and hinted that complementary public policies (including more flexible aid rules) were needed to boost competitiveness.
1992	Treaty of Maastricht (Treaty on European Union)	Introduced, for the first time, an explicit legal basis for industrial policy (Article 157 EC). The policy was to promote competitiveness and innovation without distorting competition.
1993	White Paper "Growth, Competitiveness, Employment" (Delors)	Outlined a European strategy for sustainable growth and reindustrialization, linking industrial policy to technological innovation and employment creation.
1994	Rescue and Restructuring Aid Guidelines	Consolidated the Commission's hierarchical, ordoliberal control regime; introduced strict conditions for State aid to firms in difficulty.
1996	Buchan Report – The Single Market and Tomorrow's Europe	Reviewed the state of market integration ten years after the Cecchini Report; called for complementary social and cohesion measures to reinforce legitimacy and growth.
2000	Lisbon Strategy	Sought to reconcile market integration with innovation and social cohesion; indirectly called for a more facilitative interpretation of aid rules.
2003	Sapir Report – An Agenda for a Growing Europe	Identified institutional incoherence and called for strategic reorientation of public policy instruments, including targeted State aid.
2004	Kok Report – Facing the Challenge	Urged relaunch of the Lisbon Strategy with greater implementation focus, innovation investment, and a more pragmatic governance approach.
2005	State Aid Action Plan (SAAP)	Marked a major ideational shift toward "less and better targeted aid," incorporating economic analysis into State aid control.
2008	General Block Exemption Regulation (GBER)	Expanded categories of aid exempt from notification, initiating a negotiated coordination mode between the Commission and Member States.
2010	Monti Report – A New Strategy for the Single Market	Proposed a comprehensive political relaunch of the Single Market, linking competition, cohesion, and industrial policy under a "highly competitive social market economy."
2012	State Aid Modernisation (SAM)	Streamlined procedures; aligned State aid control with the Europe 2020 Strategy, emphasizing targeted intervention and administrative efficiency.
2020	Temporary Framework for COVID-19	Suspended many aid restrictions; demonstrated flexibility but revealed fiscal asymmetries among Member States.
2022	Temporary Crisis Framework (Energy and Ukraine)	Further relaxed aid rules in response to the energy crisis; deepened debate about EU-level funding mechanisms.
2023	Green Deal Industrial Plan and EU Chips Act	Signalled a geostrategic reorientation of EU industrial policy and unprecedented flexibility in State aid rules.
2024	Letta & Draghi reports	Reframed the Single Market around resilience, solidarity, and competitiveness; legitimized a coordinated European industrial strategy.

Source: Authors' elaboration.

2.4. Evolution of EU State aid regimes

2.4.1. Ordoliberal guardian (circa 1980s – 2000s)

Under the ordoliberal guardian regime, an ordoliberal state model coupled with a hierarchical governance mode meant that the Commission acted as a legalistic gatekeeper, prioritizing market discipline above all. This first regime conceptualized EU State aid control primarily as an instrument of market discipline and economic integration. Supranational oversight was deemed essential to maintain a level playing field in the nascent single market. In practice, the Commission served as a

strict regulatory guardian, vigilantly policing Member States' use of subsidies to prevent market distortions.

In the founding decades of the European Economic Community, Articles 92-94 of the Treaty of Rome (now 107-109 TFEU), inspired by the earlier framework established in Article 67 of the Treaty of Paris, set out a general prohibition of State aid with exceptions and entrusted oversight to the Commission. However, actual enforcement in the 1960s and 1970s was cautious and largely legalistic. There were limited case practice and substantial deference to Member States and the Council during that period (Bacon, 2017; Warlouzet, 2019). Early control relied on notification, soft guidance, and sporadic European Court of Justice jurisprudence. Only from the late 1970s-1980s did DG Competition (the Commission's competition authority) consolidate a systematic, economics-informed enforcement approach (Smith, 1996; Blauberger, 2012).

During this period (roughly the 1980s through the early 2000s), State aid control was framed as a technocratic enforcement regime. Much of the literature documents how this regime was constructed and the purposes it served, tracing the development of State aid rules (e.g., Aydin & Thomas, 2012; Blauberger, 2012) and highlighting the ordoliberal foundations of EU competition policy and the institutionalization of top-down enforcement by the European Commission and the Court of Justice. In essence, State aid policy was about constraining national subsidy behaviour to protect the common market.

One theoretical lens frequently applied to this trajectory is the principal-agent model (Büthe, 2016; Doleys, 2013; Pollack, 2003; Zahariadis, 2010). Member States (the principals), concerned about protectionist subsidy races and competitive distortions, delegated enforcement powers to the Commission (their agent) to credibly commit everyone to restraint. This delegation created a rule-based regime aligned with market-liberal norms. State aid control, in this view, solved a collective action problem: without a strong central enforcer, governments would have incentives to subsidize domestic firms (especially under political pressures), leading to retaliation and a fragmentation of the internal market. By empowering the Commission to police subsidies, the EU ensured competitive neutrality and fiscal discipline across Member States, reflecting both the legal and ideological spirit of the Treaty of Rome and the prevailing neoliberal economic thought of the late 20th century (Kassim & Lyons, 2013).

Empirically, the strict control regime coincided with a reduction in state subsidies as a share of GDP throughout the 1990s. The Commission's annual State Aid Scoreboard recorded a steady decline in aid volumes in the EU into the early 2000s, widely interpreted as a policy success that curbed wasteful spending and fostered market-convergent outcomes (Blauberger, 2009; Botta, 2016; Kassim & Lyons, 2013). High-profile enforcement cases during this era underscored the Commission's resolve. For example, the Commission imposed restructuring conditions on aid to failing national champions in

sectors like airlines, shipbuilding, and steel, and it demanded the repayment of unlawful subsidies (Keulen & Kroeze, 2021; Lawton, 1999; Schmidt & Schmidt, 2006; Smith, 1996). These decisions were consistently upheld by the European Court of Justice (for instance, the Air France ruling in 1994) which reinforced the Commission's broad discretion even in politically sensitive cases (Keulen & Kroeze, 2021; Warlouzet, 2019).

Institutionally, DG Competition consolidated its influence over State aid through a growing corpus of soft-law instruments (Cini, 2001). Although guidelines and communications are formally non-binding, they effectively defined the criteria for acceptable aid. For instance, the Commission's 1994 Rescue and Restructuring Aid Guidelines stipulated strict conditions for bailouts (e.g. one-time intervention, time-bound aid, and a credible restructuring plan) (Heimler & Jenny, 2012; Smith, 1996). This ensured that even where aid was allowed, it came with tough strings attached to minimize distortions (Heimler & Jenny, 2012). The reliance on such guidelines and the Commission's vigilant monitoring reinforced a competition-first logic (Kassim & Lyons, 2013): Member States learned that only aid addressing clear market failures (like regional underdevelopment or SME financing gaps) would be approved, whereas overt industrial favouritism would be blocked (Blauberger, 2009).

In this era, industrial policy was largely subordinated to competition policy. Broader economic goals, such as innovation or regional development, were pursued through instruments (e.g. infrastructure spending or tax incentives) that avoided classification as State aid, or via supranationally managed structural funds subject to stringent conditionalities. Even the EU's own initiatives, such as the Lisbon Strategy (2000) which aimed to boost competitiveness, refrained from endorsing national subsidy schemes, underscoring the prevailing view that competitiveness should be achieved by market-conforming means, not state support. As Blauberger (2009) notes, Member State discretion in this era was tightly constrained: only horizontal aid (open to all firms meeting certain conditions and justified by market failures) was broadly tolerated, whereas vertical or selective aid favouring specific firms or industries was heavily scrutinized or prohibited.

The Commission thus acted as a largely apolitical, legalistic enforcer, applying uniform rules and resisting any politicization of State aid decisions. Contemporary observers described it as a "supranational entrepreneur" using quasi-judicial authority to advance market liberalization (Aydin, 2014; Blauberger, 2009; Cini, 2021; Smith, 1996). The underlying moto of the ordoliberal guardian regime was clear: aid is to be avoided. Subsidies were seen as distortive last resorts, acceptable only in narrowly defined circumstances.

Although this model was presented as technocratic and above politics, it embedded specific political choices. By privileging market allocation and fiscal restraint, the ordoliberal regime preferred certain interests (e.g. competitive firms or countries with strong industries that did not need subsidies) over others (e.g. industries or regions that might have benefited from state aid). The one-size-fits-all

discipline, while promoting convergence on paper, also constrained the developmental strategies of more interventionist Member States.

By the late 1990s and early 2000s, influential voices had begun to question the sustainability of such a rigid approach. The Cecchini Report (1988), which quantified the gains from completing the Single Market, hinted that complementary policies (including a more flexible interpretation of State aid rules) might be needed to ensure competitiveness in a globalizing economy (Cecchini et al., 1988). This line of reasoning anticipated later initiatives, most visibly the Lisbon Strategy (2000), which sought to reconcile market integration with investment in innovation and cohesion. Together, these ideas prepared the ground for a recalibration of State aid policy in the 2000s, paving the way for a more facilitative approach.

2.4.2. Embedded facilitator (mid-2000s – 2010s)

Under the embedded facilitator regime, a controlled dirigiste state model paired with a negotiated coordination governance mode reframed State aid as a tool for positive intervention, within agreed limits. By the early 2000s, the limits of the strict ordoliberal approach were becoming evident. The EU faced new challenges that the orthodox State aid regime struggled to address. Slow growth and high unemployment in parts of Europe, the push for innovation and a knowledge economy (articulated in the Lisbon Strategy 2000), and the needs of new Member States after the 2004-07 enlargements all intensified debates about how strictly to police state intervention. Even as global competition sharpened (with the rise of U.S. and Asian tech giants), many began to ask whether EU rules could be adapted to better facilitate investment in competitiveness, innovation, and cohesion, rather than simply restrain aid.

This reframing was reinforced by two high-level reports in 2004. The Sapir Report diagnosed the EU's poor growth record as the result of incoherent instruments and called for more flexible but strategic use of public intervention, including cohesion and State aid (Sapir et al., 2003). The Kok Report echoed these concerns and urged stronger delivery mechanisms to relaunch the Lisbon Strategy (Kok, 2004). Both texts anticipated the discursive and procedural turn that would materialise with the SAAP.

A turning point came with the State Aid Action Plan (SAAP) of 2005, launched under Competition Commissioner Neelie Kroes. Although framed by the slogan "Less and better targeted State Aid," its main innovation lay in introducing a refined economic approach to State aid control. This approach replaced a formalistic assessment of compatibility with an economic analysis weighing the positive effects of aid (such as correcting market failures or fostering innovation and cohesion) against its negative effects on competition and trade (Blauberger, 2009; Davies, 2010; Segura Catalán & Clayton, 2013). The slogan's "better targeted" component was subsequently operationalized through the General Block Exemption Regulation (GBER), adopted in 2008. This regulation consolidated earlier

sectoral block exemptions from the late 1990s into a single framework specifying areas and conditions under which aid could be granted without prior notification, as long as the aid met preset criteria (Doleys, 2013; Mause & Gröteke, 2017; Piechucka et al., 2023; Stąpniak-Kucharska, 2013). Together, the SAAP and the first GBER redefined State aid as a potential instrument of public policy rather than an inherent distortion, embedding economic reasoning at the core of EU enforcement practice (Cini, 2021; Kassim & Lyons, 2013). This marked an explicit shift in philosophy: while the Commission still sought less overall aid (continuing to discourage general or wasteful subsidies), it now openly endorsed better targeted aid for well-defined purposes like R&D, small businesses, regional development, and environmental protection (Cini, 2021; de Cecco, 2019; Doleys, 2013; Heimler & Jenny, 2012; Kassim & Lyons, 2013). In other words, certain categories of aid were reimagined not as distortions but as potential corrections for market failures or as investments in common European goals (Doleys, 2013; Heimler & Jenny, 2012). This crystallized a distinction between "good aid" (support that corrects market failures or advances agreed objectives) and "bad aid" (support that merely props up uncompetitive firms or perpetuates excess capacity).

Ideationally, the state model underlying this regime can be described as "controlled dirigisme" or an embedded liberalism compromise, resonating with John Ruggie's (1982) concept. The state (and the EU) acknowledged a legitimate role in guiding market outcomes (for example, correcting regional inequalities or fostering innovation) but this intervention was to remain market-friendly and conditional. In EU discourse, this was captured by references to a "social market economy" (enshrined in the Lisbon Treaty 2009): an economy that is market-based yet complemented by social and developmental policies. The Commission's communications in this period began to emphasize outcomes like competitiveness, innovation, and sustainability alongside the traditional language of competition and distortion control (Ferri & Piernas López, 2019).

Institutional reforms mirrored this ideational shift. The Commission gradually expanded the GBER, with the 2014 revision significantly broadening the scope of exempted aid (covering SMEs, R&D, environmental protection, training, etc.), thereby further decentralizing decisions on what was now considered "good aid." The Commission's role evolved from case-by-case micro-scrutiny to setting boundaries and verifying compliance, essentially a trust-and-verify model in which Member States were granted discretion within common rules (Gierow, 2025). Complementary safeguards (like requiring competitive bidding processes for aid awards or mandating that results of subsidized research be disseminated) were introduced to ensure that even permitted aid would minimize distortions (Boasson, 2019; Gierow, 2025). Regulation was thus repurposed to enable targeted, rule-based intervention aligned with shared European objectives.

From a multi-level governance perspective, State aid control during this period operated through bilateral but vertically networked relations between the Commission and individual Member States.

Interaction increasingly relied on dialogue and mutual adjustment rather than coercion: compliance was fostered not only by the threat of sanction but through shared norms about what constituted "good" versus "bad" aid (Cini, 2021). This evolution paralleled broader EU trends toward soft coordination. Notably, the Open Method of Coordination introduced under the Lisbon Strategy promoted convergence via guidelines, benchmarking, and peer review rather than binding rules. The Commission still held ultimate authority to veto incompatible aid, but it increasingly engaged ex ante with Member States to design aid schemes. The relationship became somewhat more symmetric and trust-based, reflecting the Commission's recognition that strict hierarchy had to give way to guided flexibility for the system to remain effective and legitimate.

The culmination of these trends was the State Aid Modernisation (SAM) initiative (2012-14), which further streamlined control procedures. SAM raised the coverage of block-exempted (self-approved) aid measures to roughly 90% of aid volume (Colombo, 2019; Pesaresi & Peduzzi, 2018), meaning that most routine aid programs meeting GBER conditions no longer required Brussels' prior approval. This allowed the Commission to focus its scrutiny on the most distortive cases, improving efficiency. SAM explicitly aligned State aid enforcement with the EU's Europe 2020 growth strategy, signalling that well-designed public aid was now considered complementary to market forces rather than inherently suspect.

By the mid-2010s, the State aid regime had matured into a hybrid system: the Commission preserved its gatekeeping role, now grounded in economic analysis, but increasingly acted as a broker of national investments aligned with EU-wide priorities. It had become, in effect, a facilitator of national industrial policy by proxy: using its regulatory capacity to green-light and guide public investments in designated priority areas (Ferri & Piernas López, 2019; Mause & Gröteke, 2017). The Commission simplified many rules and encouraged aid to merit goods like broadband networks, R&D, renewable energy, and SMEs, while continuing to tightly restrict support for inefficient firms or sunset industries. Governance became more steered and cooperative, relying on consultations, guidelines, and conditional approvals rather than blunt prohibitions. The guiding motto shifted to aid can be good, if properly targeted.

However, even this embedded facilitator regime carried tensions. It depended on a delicate balance: allowing more national flexibility without undermining the internal market. There were persistent concerns about asymmetry, namely, that richer Member States could make far greater use of the new flexibility (via large R&D programs, green energy schemes, etc.) than poorer ones, potentially widening regional disparities. Evidence from broadband deployment policies corroborates this concern, showing that institutional design strongly influence the extent to which Member States can mobilise available State-aid instruments (Manica et al., 2024). During the eurozone crisis and its aftermath, Germany, for instance, made extensive use of GBER exemptions and aid schemes for its

Mittelstand and energy transition, while fiscally constrained countries had far less capacity to do so (Schneider, 2023). Still, until the late 2010s, these concerns were somewhat contained, as overall aid levels remained modest and within agreed bounds.

By the late 2010s, however, external pressures, including the rise of China's state capitalism, aggressive U.S. tech subsidies, and Europe's lag in key high-tech sectors, fuelled calls for a more assertive industrial policy at the European level. Critics argued that even "better" national State aid might not be enough: the EU needed bolder, coordinated action to create European champions and secure critical technologies. This paved the way for the next phase: the geostrategic orchestrator regime, where industrial strategy and global rivalry took centre stage, prompting a further evolution of the Commission's role and the State aid rulebook.

This recalibration of the State aid regime also reflected a broader policy debate within the European Commission about the social and political foundations of the Single Market. Successive reflections, from The Single Market and Tomorrow's Europe (Buchan, 1996) to A New Strategy for the Single Market (Monti, 2010), stressed that deepening integration required renewed legitimacy and stronger complementarity between competition policy, industrial development, and social cohesion. These reports anticipated the subsequent evolution of EU State aid control toward a more facilitative and strategically coordinated framework, reconciling market discipline with developmental goals.

2.4.3. Geostrategic orchestrator (2020s – present)

Under the geostrategic orchestrator regime, a geostrategic state model aligned with a multi-level orchestration governance mode has enabled the Commission to coordinate strategic investments across the EU in pursuit of collective goals. This period captures an ongoing transformation in EU State aid governance that accelerated around 2020. In this emergent regime, the Commission increasingly assumes the role of a geostrategic orchestrator in close coordination with Member States. The prevailing state model is one of geostrategic interventionism, a mode of economic governance aimed not at narrow national development alone but at collective European empowerment in an era of intense geo-economic competition (Di Carlo & Schmitz, 2023; Seidl & Schmitz, 2023). Correspondingly, the governance mode is characterized by multi-level orchestration, whereby national and EU tools are jointly mobilized to support pan-European priorities such as technological sovereignty, industrial resilience, and a competitive green transition. The guiding motto has become aid as a tool, a strategic lever rather than something to avoid or merely tolerate.

Several converging forces have propelled this paradigm shift. First, intensifying global pressures forced a re-evaluation of EU orthodoxy. The United States' Inflation Reduction Act (IRA) of 2022, a large-scale green subsidy package, and China's long-standing subsidization of strategic industries starkly demonstrated the limits of relying on WTO disciplines or free-market forces alone. These

external shocks pushed the EU toward market activism: without a more proactive stance, the EU risked deindustrialization or strategic dependence in critical sectors. Concepts like European champions, technological sovereignty, and a "geoeconomic turn" became mainstream in policy discourse (Bulfone et al., 2024; Di Gregorio & Gherardini, 2025; Wigger, 2024). Debates following the US IRA at the December 2022 European Council, however, shows that while the Commission proposed additional flexibility under state-aid rules, several capitals warned against replicating a subsidy race within the single market (Pop, 2022).

Second, crisis responses within the EU set powerful precedents for flexibility. During the COVID-19 pandemic in 2020, the Commission suspended most State aid constraints under a Temporary Framework, allowing Member States to deploy massive support measures (Boschiero & Silingardi, 2023; Ferri, 2021; Meunier & Mickus, 2020). Similarly, the 2022 Temporary Crisis Framework responded to the energy price surge and the war in Ukraine by relaxing aid rules to enable large-scale national subsidies (Bora & Schramm, 2024; Gierow, 2025). These emergency frameworks demonstrated that extraordinary flexibility in State aid could preserve stability, yet they also exposed significant inequities. Under the COVID framework, Germany and France together accounted for over half of all approved aid, far outspending other Member States (Ferri, 2021; Jafarli, 2022). This raised concerns about internal market fragmentation: fiscally powerful states could shield their firms better, gaining long-term advantages. These dynamics also generated increasing unease among fiscally constrained member states. Belgium's prime minister, Alexander De Croo, openly criticised the successive relaxations of the Temporary Framework as fuelling an intra-EU subsidy race that structurally advantages governments with 'the deepest pockets.' He argued that competitiveness concerns required deepening the single market and adopting EU-level instruments rather than relying on national aid envelopes (Dubois, Foy & Hall, 2023). The experience spurred debate about EU-level instruments, notably a proposed European Sovereignty Fund, to provide common funding for strategic investments (Di Carlo & Schmitz, 2023; Fabbrini, 2024). Although no such fund has been agreed to at the time of writing, the debate marked a recognition that leaving strategic aid entirely to national budgets could undermine cohesion. Scholars have warned that a more permissive regime, if not coupled with EU coordination and redistribution, risks creating a two-speed Europe (Lopes-Valença, 2025; Wigger, 2023).

Third, a deliberate political shift at the top of the EU embraced industrial strategy. The von der Leyen Commission (2019-present), though rooted in a competition-oriented tradition, explicitly turned toward industrial policy. Even traditionally pro-competition figures such as Executive Vice-President Margrethe Vestager acknowledged by the mid-2020s the need for stronger industrial tools to face global challenges, albeit while stressing that competition principles should remain intact (Notermans & Piattoni, 2025). The Green Deal Industrial Plan (2023) temporarily eased State aid rules for clean-

tech sectors in response to the U.S. IRA, raising notification thresholds and aid intensity caps for renewable energy, batteries, and other climate-critical technologies (Schmitz et al., 2025; Wigger, 2024). The EU Chips Act (2023) went even further, authorizing 100% public funding for certain first-of-a-kind semiconductor facilities and creating new joint undertakings to build up Europe's chip ecosystem (Glencross, 2024). Alongside the €750 billion NextGenerationEU recovery fund (launched in 2020), these initiatives marked a qualitative leap toward collective industrial policy at the EU level. Together with the operacionalisation of IPCEIs (now covering batteries, hydrogen, microelectronics, and other key technologies), these developments signal the emergence of a coordinated European industrial strategy (Di Gregorio & Gherardini, 2025; Wigger, 2024). IPCEIs allow multiple Member States to co-finance large cross-border projects of strategic importance under specific conditions of innovation, co-investment, and EU-wide benefit (Sandberg, 2016; Ferri & Piernas López, 2019; Schmitz et al., 2025). This mechanism enables a Europeanized form of industrial policy, channelling dirigiste ambitions through a collective, rule-governed framework with the Commission orchestrating the plans.

In parallel, high-level strategic reflection outside the Commission's normal machinery reinforced this shift. Two major reports commissioned by EU leaders – the Draghi Report (2024) and the Letta Report (2024) – crystallized a new vision of Europe's political economy, reframing the Single Market around competitiveness and resilience (Moschella & Quaglia, 2025). Although non-binding, both reports provided intellectual and political legitimacy for a broader interpretation of State aid rules, urging joint European funding and planning to match U.S. and Chinese state-led industrial strategies. In effect, they sketched out an EU that would act in a more developmental state capacity at the supranational level.

Scholars broadly interpret these developments as part of Europe's geoeconomic turn, or even the emergence of a European developmental state (Di Carlo & Schmitz, 2023; Gräf, 2024; McNamara, 2023; Seidl & Schmitz, 2023). The EU is moving beyond the traditional market-state dichotomy, experimenting with ways to combine market discipline with strategic intervention to strengthen its global position. This represents a departure from the EU's historical aversion to intervention: what was once primarily a regulatory state is evolving an element of orchestration or guidance of industrial development.

2.5. Discussion

The analysis above demonstrates that the evolution of EU State aid policy reflects a dynamic co-evolution between ideas about the state's economic role and the institutional modes through which those ideas are operationalized. This reciprocal process shows how policy paradigms, in Hall's (1993)

sense, emerge from the mutual reinforcement of ideas and institutions, generating successive equilibria that define distinct phases of policy governance. In the EU context, this co-evolution has been particularly visible in the gradual transformation of the European Commission from a hierarchical enforcer of competition discipline to an orchestrator of collective industrial strategy. The three ideal-typical regimes identified – ordoliberal guardian, embedded facilitator, and geostrategic orchestrator – mark distinct alignments of ideas and institutions, but they also reveal an underlying trajectory of adaptation and layering rather than abrupt replacement. Table 2.2 summarizes the three relatively stable regime types.

Table 2.2. Typology and evolution of EU State aid regimes

Dimension	Ordoliberal guardian	Embedded facilitator	Geostrategic orchestrator
State model	Ordoliberal (market-disciplined minimal state)	Controlled dirigiste (market-guiding intervention)	Geostrategic (market-shaping for collective autonomy)
Governance mode	Hierarchical (top-down enforcement)	Negotiated coordination (steered)	Multi-level orchestration (joint EU-multiple national action)
Commission's role	Rule enforcer	Conditional enabler	Strategic coordinator
Guiding motto	Aid is to be avoided	Aid can be good	Aid as a tool
International Context	Globalisation and internal market integration	Slowbalisation	Geo-political competition
Temporal reference	1980s – early 2000s	Mid-2000s – mid 2010s	2020s onwards

Source: Authors' elaboration.

This trajectory indicates a broader pattern in European political economy that several scholars have described as a shift from negative to positive integration (Scharpf, 1999). Under the ordoliberal guardian regime, the state model privileged market discipline, and the corresponding governance mode (hierarchical enforcement) was consistent with the EU's early "regulatory state" logic (Majone, 1994). The Commission's authority rested on formal legal control designed to prevent distortions and protect the level playing field of the single market. This institutional design was sustained by an ideational consensus that markets, not governments, should allocate resources efficiently. Such a configuration aligned with the disciplining paradigm of European economic governance identified by Schmidt and Thatcher (2013), in which technocratic institutions insulated from political bargaining implemented liberal economic norms.

Yet, as Campbell (1998) and Streeck and Thelen (2005) note, institutional evolution often occurs through gradual adjustments, including conversion, layering, and drift, rather than through sudden rupture. Comparative analysis of broadband State aid governance confirms that such gradual institutional adjustments, driven by pre-existing administrative legacies, generate divergent national approaches and uneven implementation capacity (Manica et al., 2025). The embedded facilitator regime emerged through precisely such mechanisms: essentially a reinterpretation of the ordoliberal

guardian framework that incorporated new economic ideas while preserving its basic legal infrastructure. The controlled dirigiste state model that surfaced during the 2000s recast intervention as compatible with market efficiency, under the notion of "better targeted" aid to correct market failures (Doleys, 2013; Mause & Gröteke, 2017). This ideational shift legitimized a new governance mode – negotiated coordination – where rules became instruments of selective facilitation rather than outright prohibition. The transformation did not eliminate hierarchy so much as hybridize it with elements of network coordination, producing what Borrás and Radaelli (2011) describe as a "governance architecture" combining soft guidance and hard oversight.

In this phase, the co-evolutionary dynamics was bidirectional. Ideational change toward a more constructive view of state intervention prompted institutional reforms such as the SAAP (2005) and SAM (2012-14), and these reforms in turn institutionalized a culture of conditional flexibility that reinforced the new paradigm. As Blauberger (2009) observed, the Commission began distinguishing "good" from "bad" subsidies, effectively redefining what counted as legitimate public intervention. The expansion of block exemptions and the IPCEI mechanism exemplified institutional adaptations that embedded this ideational shift into the EU's regulatory routines. What emerged was a pattern of "directed flexibility" (Eberlein & Kerwer, 2004), in which the Commission maintained control over the boundaries of acceptable intervention while encouraging Member States to act within those boundaries.

The most recent transition to the geostrategic orchestrator regime deepened this co-evolutionary logic. Here, ideas of sovereignty, resilience, and technological autonomy restructured the prevailing state model toward what Seidl and Schmitz (2023) call "geo-dirigisme", a belief in state-led coordination as a response to global power competition. In parallel, governance evolved into multi-level orchestration, an institutional form that Abbott et al. (2015) define as "indirect governance through intermediaries." The Commission no longer merely controls or steers; it orchestrates, mobilizing national and supranational actors around imperative strategic goals. The reactivation of dormant legal instruments (e.g., Article 107(3)(b) TFEU), the proliferation of IPCEIs, and the relaxation of aid rules under the Green Deal Industrial Plan illustrate how existing frameworks have been repurposed for new ideational ends. This orchestration is not a simple bilateral mode between the Commission and individual Member States; it is a genuinely multilateral one that involves multiple states and stakeholders interacting within a coordinated system.

This process aligns with insights from discursive institutionalism, which emphasizes how ideas gain authority as they become institutionalized through discourse and practice (Schmidt, 2008). The geostrategic paradigm has acquired legitimacy not via formal Treaty change but through iterative reinterpretation of existing rules in light of new narratives about global competitiveness and security. The Commission's evolving discourse – from one of competition neutrality to one of industrial

resilience – has both reflected and reinforced the new governance configuration. As McNamara (2023) and Di Carlo and Schmitz (2023) note, this ideational reorientation signals a broader geoeconomic turn in European integration, one that recasts market regulation as a means of strategic capacity-building rather than a constraint upon it.

The co-evolution between state models and governance modes yields several theoretical implications. First, it highlights the reciprocal nature of ideational and institutional change. Rather than a unidirectional causal link, EU State aid evolution exhibits a recursive feedback loop in which institutional flexibility enables new ideas to be tested, and successful ideas are subsequently institutionalized (see Figure 2.2). This dynamic accords with a historical institutionalist account of gradual transformation (Streeck & Thelen, 2005) and supports Berman's (2013) view that institutional legitimacy depends on the adaptability of ideas to changing socioeconomic environments. The Commission's incremental reinterpretation of its mandate exemplifies such adaptability, allowing the EU to maintain continuity while accommodating new strategic imperatives.

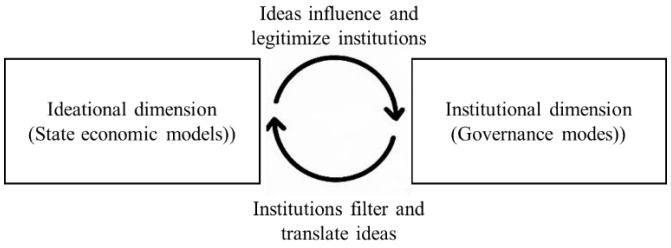


Figure 2.2. Analytical framework for the interaction between ideas and institutions in state economic governance.

Source: Authors' elaboration

Second, the trajectory of EU State aid governance illustrates a shift from primarily regulatory to more developmental logics in supranational administration. Scholars such as Mertens and Thiemann (2019) and Zeitlin (2021) have argued that the EU is evolving from a rule-based to a project-based polity, in which coordination and experimentation take precedence over rigid compliance. The multi-level orchestration mode observed in the geostrategic orchestrator phase reflects this transition. It extends the logic of metagovernance (Sørensen & Torfing, 2009), wherein the Commission acts as facilitator and convener rather than as a purely hierarchical controller. This configuration enables policy learning and coordination across levels, but it also depends on complex forms of soft power and trust. In practice, effective orchestration of collaborative networks requires that leaders perform multiple governance functions, such as aligning diverse actors, mobilizing resources, and monitoring progress, to foster cooperation and joint outcomes (Wegner & Verschoore, 2021). The sustainability of such a system hinges on the Commission's capacity to balance strategic initiative with procedural fairness, a tension closely related to debates on "collaborative innovation" in public administration

(Sørensen & Torfing, 2011). Indeed, the Commission's new role resembles that of a network manager who must motivate and coordinate, not just command, a role extensively discussed in the collaborative governance literature (Ansell & Gash, 2008; Sørensen & Torfing, 2011).

Third, the co-evolutionary perspective situates State aid policy within a broader reconfiguration of European economic governance. The gradual convergence between state models and governance modes reflects a long-term movement from ordoliberal constraint toward what Notermans and Piattoni (2025) term "ordo-Keynesianism," a hybrid framework that preserves fiscal prudence while embracing targeted intervention for macroeconomic and industrial objectives. This transformation is consistent with trends in other policy domains – including EU fiscal coordination and climate policy, indicating the emergence of a post-ordoliberal consensus marked by selective strategic activism (Bulfone et al., 2024). In this sense, the co-evolution of ideas and institutions in State aid is not an isolated phenomenon but part of a systemic recalibration of the European political economy.

At the same time, this co-evolution remains incomplete and contested. The new geostrategic orchestrator regime amplifies the Commission's political discretion, potentially over-stretching the boundaries of its delegated authority (Lindstrom, 2024). Without commensurate fiscal integration, as Hodge et al. (2024) and Lopes-Valença (2025) warn, the reliance on national resources risks reinforcing asymmetries between Member States. The ideational shift toward strategic sovereignty thus requires institutional innovations capable of embedding solidarity and common financing. Otherwise, the equilibrium between state model and governance mode may prove unstable. In this respect, the Draghi (2024) and Letta (2024) reports can be interpreted as attempts to articulate a new ideational-institutional synthesis: a sovereign (centralised) European developmental model underpinned by coordinated funding and planning mechanisms. The emerging agenda points toward an EU-level developmental framework in which strategic autonomy is operationalised through common financing instruments, coordinated industrial investment and strengthened supranational capabilities. Such proposals signal an attempt to move beyond a regulatory union toward a fiscal-industrial polity capable of sustained collective action (Foy & Johnston, 2023).

Another important aspect of the emerging regime concerns its democratic legitimacy. The earlier ordoliberal model offered relatively high input legitimacy through uniform, rule-based procedures but increasingly lacked output responsiveness to new economic and social challenges. The geostrategic orchestrator model reverses this balance: it strengthens output legitimacy by enabling more effective problem-solving, yet risks eroding input legitimacy through greater discretion and opacity. As Daugbjerg and Fawcett (2015) observe, different governance structures generate distinct combinations of input and output legitimacy, depending on how authority and accountability are distributed. In the EU context, the shift from hierarchical enforcement to orchestration enhances responsiveness and flexibility but also amplifies asymmetries and reduces transparency. These trade-

offs are inherent to metagovernance and highlight the need to anchor the Commission's orchestration role in mechanisms that preserve fairness, accountability, and public trust.

To address these challenges, it will be essential to strengthen accountability mechanisms within the EU's evolving metagovernance framework. Sørensen and Torfing (2009) emphasize the need for ensuring democratic anchorage of governance networks, that is, linking network decisions back to democratically authorized institutions and publics to maintain their legitimacy. Applied to EU State aid, this could involve greater transparency in how exemptions and strategic projects are decided, as well as more systematic involvement of elected bodies and stakeholders in setting priorities. For example, the European Parliament and national parliaments could be given a role in scrutinizing or guiding the use of extraordinary aid flexibilities for strategic goals. Stronger legal safeguards have also been advocated: Gierow (2025) argues for enhanced judicial review of State aid guidelines and decisions to ensure that the Commission's broadened discretion remains within legitimate bounds. Proposals like a European Sovereignty Fund, mentioned earlier, suggest another avenue to embed solidarity and accountability, by pooling resources at the EU level, such a mechanism could mitigate unequal national capacities and be subject to joint governance, thereby improving both effectiveness and perceived fairness. In essence, as the EU moves toward an orchestrator role, it must devise new legitimacy mechanisms so that its greater flexibility and ambition are matched by robust oversight and inclusiveness.

On a more optimistic note, the evolution of EU State aid governance demonstrates how public governance can compensate for failures of both markets and member-state unilateralism when it adapts in innovative ways. As Peters (2021) observes, well-designed public governance arrangements have the potential to effectively address problems that markets or fragmented governments struggle to solve. The EU's shifting State aid regime, from restraining harmful subsidies to orchestrating strategic investment, illustrates this optimism by showing the Union's capacity to learn and adjust its governance model in pursuit of collective European goals. The justification for this new governance mode will ultimately rest not only on its outputs (e.g., improved resilience and competitiveness) but also on its ability to maintain democratic accountability. If the EU can achieve that balance, the transformation of State aid policy may come to be seen as a cornerstone in the positive evolution of the European administrative state.

2.6. Conclusion

Existing scholarship on EU State aid has traced its legal development and institutional tensions, but it has often treated reforms as narrow technocratic adjustments or as isolated responses to specific instruments (e.g., IPCEIs, GBER) and crises. In contrast, this article has offered a broader interpretative

framework that links ideal-typical policy regimes to underlying shifts in integration logic and political economy. Rather than simply cataloguing policy changes or classifying academic viewpoints, the typology reconstructs the ideational trajectory of EU State aid, highlighting how permissiveness, coordination, and strategic intent have gradually displaced a strict prohibitionist logic.

EU State aid policy now stands at a critical and ambiguous juncture. Once firmly anchored in ordoliberal principles and focused on prohibiting distortive subsidies, it is being reconfigured into a more permissive and strategically oriented regime. This evolution reflects not only external pressures but also a deep reorientation in the EU's governance model; one that moves beyond the old binary of market versus state toward a calibrated interplay between the two in pursuit of collective goals. The proposed typology (ordoliberal guardian, embedded facilitator, geostrategic orchestrator) traces this transformation conceptually and historically. By integrating ideational and institutional dimensions, it provides a lens to understand how a tool of competition policy has been repurposed into an instrument of industrial policy and state-capacity-building at the supranational level.

Looking ahead, the changing face of EU State aid raises important issues for public administration and institutional theory. It remains uncertain whether the EU can develop the administrative capacity and legitimacy mechanisms needed for its new role as an industrial orchestrator. The emergent multi-level governance arrangements could potentially solidify into a stable European "administrative space" for State aid, or they could provoke backlash and calls for renationalization or re-regulation if they are perceived as overreaching. Likewise, a system that relies more on coordination and discretion than on uniform rules must find ways to manage power asymmetries between Member States. These considerations underscore that changes in policy regimes are not just technocratic tweaks; they involve deeper negotiations about authority, accountability, and the very purpose of the European project.

This study lays the groundwork for examining these issues by clarifying the conceptual distinctions and connections between the ideas that guide state intervention and the governance structures that implement it. In doing so, it clarifies the EU's adaptive evolution, which could redefine the balance between the market and the state in Europe's political economy for years to come. Importantly, it suggests that the emergence of an EU orchestrator role in industrial policy need not undermine the European integration project, if managed wisely, it may instead mark the maturation of that project, merging the strengths of market discipline with the strategic steering needed to confront 21st-century challenges.

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CHAPTER 3

State aid for broadband network deployment: National and subnational governance mechanisms, 2003-2023

Abstract

This paper examines the governance models of State aid measures for broadband network deployment in European Union Member States. The research is based on 199 decision letters collected from the European Commission's competition cases database, published between 2003 and 2023. Deploying a theory-driven content analysis approach, the analysis reveals and categorises a variety of governance models. These models vary regarding the authority responsible for the decision-making and, in the case of national schemes, the authority responsible for the implementation, including centralised and decentralised arrangements. Different legacies and institutional set-ups explain the governance models, including the typology of state structures, the constitutional powers, the traditions of participation in the telecommunication sector, policy diffusion and regional development. There are several possible pathways to a gradual transition from one model to another. The design of flexible national schemes, which offer subnational authorities the option to implement them in their regions or to rely on central management agencies for specific tasks adapted to their interests, resources and capacities, could be the optimal solution to prevent the launch of ad hoc measures by subnational authorities and to adapt to different institutional arrangements.

Keywords: Public policy, State aid, high-tech networks, broadband, governance, multi-level governance.

3.1. Introduction

This paper contributes to disclosing the governance black box of broadband in Europe. High-speed internet access is acknowledged for its role in enhancing economic prospects, especially in rural areas, where it stimulates business activity, broader economic development and employment (for a review of the literature on this topic, see Mack et al., 2023). Despite the European Commission's ambitious Digital Agenda for Europe (DAE) adopted in 2010, which aimed to ensure fast broadband availability (over 30 Mbps) for all European Union (EU) population by 2020, only Malta and Cyprus would eventually meet the target (DESI, 2020). In 2016, the Commission set more ambitious and long-term targets for network deployment by 2025. These targets include providing universal access to networks

with download speeds of at least 100 Mbps (i.e., through Very High-Capacity Networks - VHCN) (EC, 2016a). Additional targets have also been proposed for 2030, with the aim of providing fixed gigabit network coverage to all European households (EC, 2021).

To achieve these objectives, most EU Member States have implemented broadband plans with similar coverage targets (OECD, 2018). Some have also foreseen the use of State aid, as private initiatives often fail to provide necessary infrastructure under normal market conditions in areas of low population density or remote regions. In 2003, the European Commission started to assess State aid measures for broadband deployment at the community level (Chirico & Gaál, 2014). The European Commission has encouraged the use of State aid to develop broadband networks, allocating, since 2007, funds through various financial support instruments. These funds, which can partly be used to support the rollout of broadband, come from the European Structural and Investment Funds (ESIF), including the Regional Development Fund (ERDF), the Agricultural Fund for Rural Development (EAFRD), the European Social Fund (ESF) and the Cohesion Fund (CF) (Bourreau et al., 2020). In addition, there are specific programs with smaller budgets that support broadband network deployment, such as the Connecting Europe Facility (CEF). Finally, the Recovery and Resilience Facility (RRF), which includes a digital component, serves as the primary recovery instrument within the Next Generation EU Multiannual Financial Framework (MFF). The RRF is intended to aid the EU in its recovery from the current crisis and is expected to improve broadband infrastructure and digital connectivity across Member States.

Since 2003, Member States have invested billions of euros to expand network coverage in areas where private investors find it unprofitable. State aid programs have been determined predominantly at national government levels and are typically channelled through the central government. However, central state authorities do not always decide on this, reflecting the diverse institutional settings across Member States (Briglauer & Grajek, 2023). In some countries, broadband interventions have been conducted at regional or local/municipal levels, while other nations have pursued a larger-scale national intervention strategy. Even when countries adopt a national plan, the practical implementation of the plan might be pursued either by central government agencies or by subnational authorities. To put it another way, there is a plethora of governance models associated with the process of decision-making and the implementation of the aforementioned measures.

There are multiple definitions of governance, which vary depending on the academic field and the narratives used. Governance can be broadly defined as encompassing all processes of governing (Bevir, 2013, p. 1). In this study, we define governance as the power relations between central and local authorities in this public policy process. By governance models, we mean the combination of decision-making schemes (national or subnational) and the respective implementing authorities. Specifically, this study examines governance models in the context of State aid policies for broadband network

deployment. This study contributes to an agenda that advocates the introduction of new empirical approaches to the analysis of telecommunications policy (Mendonça et al., 2015).

The European Commission adopted guidelines on State aid rules for broadband network deployment in 2009, which were subsequently revised in 2013 and 2023. These guidelines primarily address technical aspects rather than governance models (EC, 2009). Governance models for State aid for broadband network deployment fall within the powers of each Member State, given the subsidiarity principle and their political-administrative institutions. Subnational authorities may promote their own State aid policies either explicitly by legislation or indirectly through broader economic development mandates or through a general power of competence (i.e., when subnational authorities have the power to do anything unless expressly prohibited). National governments may also play a role in coordinating and optimizing resource allocation at the national level, with subnational authorities often involved in policy implementation in a multilevel governance approach (Gerli et al., 2023). Although academic research exists on State aid to support the development of broadband networks, previous studies did not consider the governance component (see, for example, Bourreau et al., 2020; Chirico & Gaál, 2014). This dimension is a crucial aspect of public policies, and the present study aims to address this gap. Given the persistent deficit in network coverage within the European Union (EC, 2023a), policymakers will have to assess the need to maintain State aid for facilitating VHCN deployment in the forthcoming years. It is important to understand the political process and, specifically, the associated governance model in order to maximize the benefits of this policy. This research addresses the gap in the literature by focusing on the political processes and governmental actors involved in State aid measures for broadband networks. Through a systematic identification, categorisation, and comparative analysis of different governance models, this study aims to provide policymakers with key elements for designing effective measures and to offer scholars a foundation for further public policy research.

Against this background, the research has two objectives. First, it aims to examine and categorise the governance models found in State aid measures that have been notified by EU Member States for the deployment of broadband networks between 2003 and 2023. These governance models result from the decision-making (national plans versus individual measures) and the implementation of the national plans (centralised vs decentralised). Second, it aims to identify the national contexts that frame the different models.

This analysis aims to provide information to decision-makers at different territorial levels regarding the development of public policies, specifically State aid for high-tech network deployment. These measures are expected to become increasingly important, not only for broadband but also for advanced networks such as 5G, as they will be crucial in ensuring territorial cohesion in accessing essential infrastructure and advancing societal progress in the digital age. These networks will also

enhance EU productivity and competitiveness (EC, 2016b, p. 588; Gilles & Toth, 2021; OECD, 2019). Our study improves understanding of EU competition law, public policy, administration, and territorial development by identifying the level of government responsible for making decisions on State aid measures in a specific sector and elucidating the governance model for their implementation.

The empirical data for the study was obtained from primary sources provided by the European Commission. It comprises 122 original cases directly related to broadband deployment out of a set of 199 notified cases, a grand total including non-substantive procedural decisions. The 122 original measures provide insight into the governance models for State aid measures related to broadband network deployment. No dominant State aid set-up is revealed; indeed, each country's historical legacies and institutional structure account for the choice between a centralised or decentralised implementation governance model.

The remainder of the article is structured as follows. Section 3.2 presents the framework of analysis, and Section 3.3 provides a review of previous research on broadband deployment, State aid, and governance. Section 3.4 delivers a perspective of the institutional framework on State aid control. Section 3.5 describes the data collection method. Section 3.6 provides the analysis of the factors behind the governance models adopted by different countries and Section 3.7 the discussion of the main results from the data analysis. Section 3.8 concludes by summarising the main contributions of the article and their implications for policymaking, identifying the study's limitations and suggesting topics for further research.

3.2. Analytical framework

As the Commission's decision-making practice illustrates, public intervention in support of broadband networks may take place at state, regional or municipal level (EC, 2013, par. 40; Matteucci, 2019). The central government is typically the primary point of contact with the European Commission, even if the aid was granted by a subnational body such as federal states, regions, municipalities, or other state entities. This means that the central government is typically responsible for formally notifying the European Commission of any subnational measures while the subnational authority makes the decision to pursue the measure.[2] However, subnational authorities with access to the State Aid Notifications Interactive ("SANI") software could notify a State aid measure to the European

[2] For example, State aid for deploying optical fibre in Catalonia (Xarxa Oberta) was decided by the autonomous region of Catalonia, but the interlocutor with the European Commission was the central government, through the Ministry of Foreign Affairs (SA.28969). The same practice might be found in other municipal and regional funding cases (e.g., SA.33420 - Germany, Breitband Lohr am Main).

Commission.[3] In this context, in addition to coordinating the various interventions to avoid duplication and incoherence in the application of the aid, the European Commission encourages Member States to, whenever possible and respecting institutional competencies and specificities, design national schemes that contain the most relevant principles underlying public initiatives (EC, 2013, par. 40–41). Based on these principles, analysis framework comprises two key dimensions for assessing the territorial aspects of the political decision-making process and the implementation of State aid measures.

The first dimension considers the territorial level of the political decision-maker responsible for the measure. According to the European Commission, national plans[4] should be encouraged whenever possible (EC, 2013, par. 41). National governments determine these plans, which may function as 'umbrella' aid schemes. These framework schemes typically operate similarly to block exemptions. Individual projects can be implemented without notifying the Commission as long as they comply with the rules and conditions of the general framework scheme (Chirico & Gaál, 2014, p. 36). However, in some cases, subnational authorities may choose to allocate State aid within their territorial areas and decide on their own subnational plans, creating specific plans tailored to local needs and conditions (Gerli et al., 2023; Matteucci, 2019; Nucciarelli et al., 2013).

The territorial level of the entity responsible for implementing the measure is considered in the second dimension. A national measure can either be implemented at the national level, centrally by the government or any of its agencies, or delegated to subnational authorities (Gerli et al., 2019; Matteucci, 2020). If subnational authorities decide on specific State aid measures for their territories, they may adopt a scheme, generally to be implemented by authorities at lower levels, or adopt an individual measure.

This study uses the term 'decentralisation' to refer to two types of measures. The first type consists of nationwide central government initiatives implemented by subnational authorities. The second type includes initiatives originating from subnational authorities, regardless of subsequent execution, even if it remains centralised within the same authority or within an entity controlled by it. It includes measures implemented by any public or private law body, including regional or local bodies, regional development bodies or non-governmental organisations, which acts under the responsibility

[3] The use of the SANI software became mandatory on January 1, 2014. Before that, any public entity could also notify an intended State aid measure to the European Commission. However, irrespective of the body that formally notifies the measure, the relevant aspect from the public policy perspective in this research is the level of government responsible for the decision (and with powers to assume that decision) and not the body responsible for the administrative notification.

[4] In this paper, we use the terms 'national measures', 'national plans', 'national programmes', or 'national schemes' to refer to these centrally decided policies that have a national scope.

of a national or regional managing authority or which carries out duties on behalf of such an authority. Table 3.1 presents the conceptual grammar used in this paper.

Table 3.1. Key concepts for analysis

Decision-maker	Type of measure	Implementor	Governance model
Central government	**National measure**	Central government	**Centralised**
		Subnational government tier 1	**Decentralised**
		Subnational government tier n	
Subnational government tier n	**Subnational measure**	Subnational government tier n	**Decentralised**
		Subnational government tier n+1	

A specific feature of decentralised national governance models is the existence, or not, of a coordinator and the respective territorial tier of this coordinator. The coordinator can have an important role in ensuring that the subnational authorities implement the measures in a way compatible with the general lines defined in the national measure. This role is particularly important when the national measure leaves some options and flexibility open for the subnational authorities. Additionally, the coordinator can provide technical advice and harmonise technological options in network implementation. It can also verify spending and the allocation of public funds.

In the scope of the governance model of State aid measures for VHCN deployment, we also could potentially include the ownership of the subsidised network and the different actors, public and private, involved in the construction and/or management of the network. This aspect of the governance model has already captured the attention of academic research (e.g., Bourreau et al., 2020; Falch & Henten, 2010; Gómez-Barroso & Feijóo, 2010; Lattemann et al., 2009; Nucciarelli et al., 2010; Salemink & Strijker, 2018; Troulos et al., 2010), being excluded of the scope of this research.

Fig. 3.1 clarifies what is under and out of the scope of this research, using the typical arrangement of national and subnational measures.

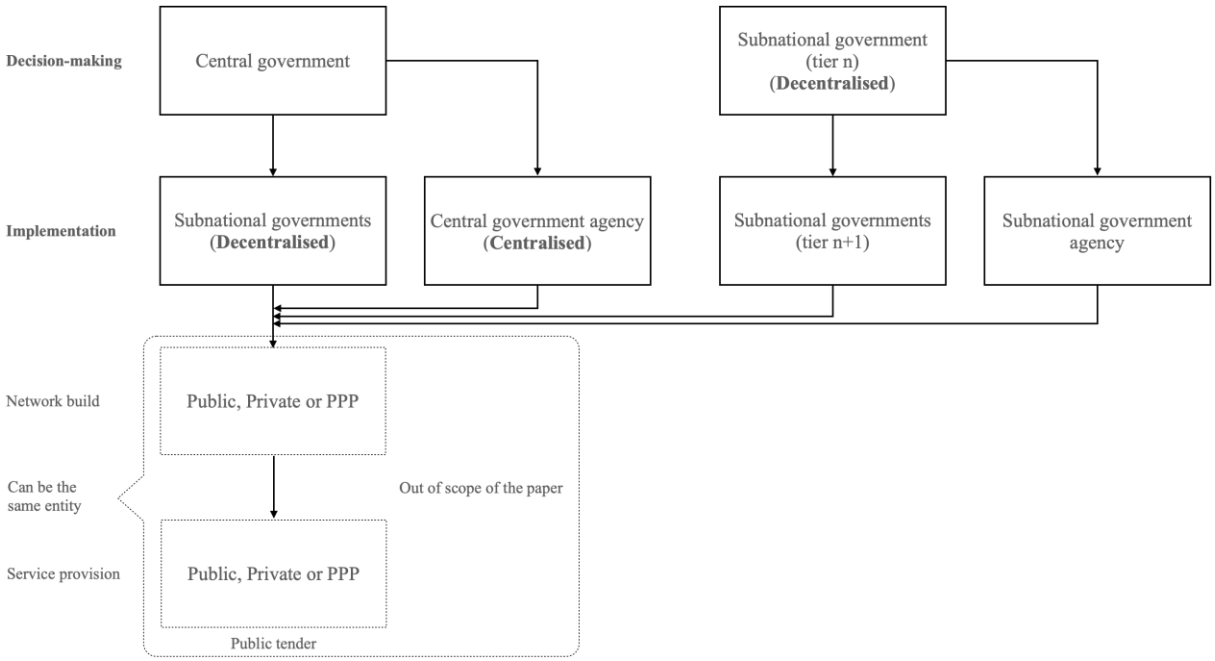


Figure 3.1. Main stages of the political process regarding State aid measures for broadband deployment, the key dimensions and actors involved and the scope of the research

3.3. The experience of public interventions in the EU

Several studies have demonstrated a link between broadband penetration and national development variables, such as income, economic growth, human capital, and labour productivity (Baker et al., 2020; Briglauer et al., 2021; de Clercq et al., 2023; Gruber et al., 2014; Gruber & Koutroumpis, 2011; Koutroumpis, 2009; Vu, 2019). Marcus et al. (2024) provide guidance to policymakers on promoting broadband deployment, adoption and usage in the context of crises such as the Covid-19 pandemic and the Russo-Ukrainian war. Expanding broadband coverage is crucial, but it may not be profitable in rural areas due to high deployment costs and a small potential subscriber base (Cambini & Jiang, 2009; Sadowski et al., 2009; Salemink et al., 2015). Several articles have examined the supply-side aspects of broadband. However, few studies have analysed the cost of broadband networks in rural areas in detail. Frias et al. (2015) compared the costs of providing 30 Mbps through FTTH ("Fiber To The Home") and LTE ("Long Term Evolution" or 4G) networks in rural areas in Spain. They concluded that in municipalities with more than 10,000 inhabitants, deploying FTTH networks is economically feasible. In municipalities with between 1,000 and 10,000 inhabitants, deploying LTE networks is more viable in most cases. Deploying either FTTH or LTE networks is not feasible for most municipalities with fewer than 1,000 inhabitants. According to Schneir and Xiong (2016), the cost of deploying a network outside a town or village in a rural area is, on average, 80% higher than deploying the network in the town or village. Ioannou et al. (2020) calculated the net present value of each access technology to ascertain the viability of LTE-based fixed wireless access (FWA) as an alternative to the existing fixed access

technology for providing broadband at 30 Mbps in Europe. In light of the aforementioned estimates, it was posited that FWA could serve as a viable solution for the provision of broadband at 30 Mbps in rural areas. However, 30 Mbps is far from the new full Gigabit coverage target proposed by the European Commission. Feijóo et al. (2018) estimated that around €50 billion would be required to achieve the DAE targets by 2020 in the EU-28, in addition to expected public and private funding. More than 90% of these investments are needed in rural areas. Ferrandis et al. (2021) conducted a similar analysis with updated data up to 2019 and confirmed a significant investment gap of €260 billion between 2020 and 2025 for the EU to meet its 2025 broadband targets. However, private operators are projected to cover only about one-third of this gap. It is concluded that extensive public interventions are needed, particularly to address investment gaps in rural areas, in order to achieve the DAE targets. A subsequent update, based on data from 2021, revealed an investment gap of €174.8 million (Ferrandis et al., 2023).

Several studies have examined the effects of State aid policies on broadband deployment in various EU Member States and regions. Specifically, research has been conducted in Germany (Duso et al., 2021), the German state of Bavaria (Briglauer et al., 2019), Italy (Matteucci, 2019), the Italian province of Trento (Canzian et al., 2019), and France (Bourreau et al., 2023).

Chirico and Gaal (2014) reported that the European Commission had examined State aid notifications for broadband network deployment, involving a total of €13 billion in subsidies across Europe as of October 2013. Bourreau et al. (2020) quantitatively assessed fifteen years of State aid for broadband in the EU based on notified measures. However, these studies did not analyse the governance models of the measures.

The concept of governance, which is crucial for comprehending policy implementation dynamics, encompasses the various ways of organizing collective action and delivering policies (Teles, 2023, p. 1). In the 1980s, political scientists distinguished the term from government and included civil-society actors. Based on Marks' (1993) research on multilevel governance in the EU, scholars have explored the distribution of authority across different levels of government and sectors, emphasising both horizontal and vertical power-sharing arrangements (Touati et al., 2019). Ansell and Torfing (2022, p. 1) highlight the multifaceted nature of governance theories and definitions, emphasising their evolution beyond traditional government-centric paradigms. Howlett and Ramesh (2014, p. 318) define 'governing' as the actions of governments, while 'governance' refers to establishing, promoting, and supporting a specific relationship between governmental and non-governmental actors in the governing process.

The governance landscape for State aid in broadband deployment involves multiple stakeholders at various levels. These stakeholders include the European Commission, central governments, subnational authorities, and national regulatory bodies. Interactions between these stakeholders

occur during the decision-making process or when implementing measures. Matteucci (2020) and Gerli et al. (2019) offer insights into governance structures and practices through case studies of broadband initiatives in Italy and the United Kingdom (UK), respectively. Gerli et al. (2023) also analyse the influence of governance frameworks on the effectiveness and efficiency of State aid programs, emphasising the significance of coordination and collaboration across different administrative levels.

3.4. Institutional background on State aid control

State aid provisions are a fundamental principle of EU law. They were included in the Treaty of Rome, signed in 1957, and are now codified in Articles 107 and 108 of the Treaty on the Functioning of the EU (TFEU). These provisions establish a general prohibition on State aid. However, Article 107 (2) deems certain categories of aid compatible with the internal market, while Article 107 (3) identifies additional categories that may also be considered compatible. Under Article 108 TFEU, the European Commission has the authority to monitor, control, and enforce State aid regulations. Member States must notify the European Commission of any plans to grant or alter aid, allowing for thorough assessment and approval procedures. The Commission has a considerable amount of discretion in interpreting the Treaty. However, it has guided soft law instruments and sector-specific guidelines to ensure transparency and consistency in evaluating State aid (Cini, 2001). This is the case, for example, of the guidelines on State aid rules for broadband network deployment adopted in 2009.

In 1992, the European Commission introduced a de minimis rule that exempts smaller amounts of aid from notification obligations (EC, 1992; Ehlermann, 1994). According to the de minimis regulation, aid amounts below a certain threshold are exempt from State aid rules. The ceiling for de minimis aid has been set at €100,000 per undertaking over a three-year period in 2002. This ceiling has been regularly updated, and as of 2023, it stands at €275,000. Subsequently, after signing the Single European Act, the Commission proposed the Enabling Regulation in the application of Article 109 TFEU. The Council approved the Enabling Regulation in 1998 (Council Regulation 994/98). This regulation enables the European Commission to adopt regulations that identify specific categories of aid as compatible and exempt them from ex-ante notification by Member States, provided that they meet certain criteria. These measures only require ex-post notification to the European Commission, reducing information requirements. In 2008, the General Block Exemption Regulation (GBER) was introduced. The European Commission's 2008 regulation excludes certain aid categories that aim to promote specific policy objectives while reducing administrative burdens on Member States (EC, 2008). In 2014, the Commission adopted an enlarged GBER that extends block exemptions to new categories of aid, including certain broadband infrastructure (EC, 2014). Simultaneously, the

Commission introduced a requirement that the Member States should conduct evaluations of all aid measures over €150 million that the GBER covers.

In the early 2020s, the European Commission adopted two temporary frameworks. The first was to address the COVID-19 outbreak in March 2020 and the containment measures taken by all Member States (EC, 2020). The second was to address the crisis caused by the Russo-Ukrainian war (EC, 2022). These temporary frameworks aimed to support the economy by enabling Member States to use the full flexibility under State aid rules to keep otherwise viable companies afloat and to help EU companies cope with problems such as disruptions in supply chains, blockages in the supply of energy and raw materials, and surges in energy prices. In 2023, the European Commission amended and partially extended the Temporary Crisis Framework to support key sectors in transitioning to a net-zero economy, in line with the Green Deal Industrial Plan (EC, 2023b).

3.5. Data

3.5.1. Data source

To develop a typology of governance models for State aid measures in broadband network deployment, we gathered data from the European Commission's competition cases database, which can be accessed at https://competition-cases.ec.europa.eu/search. We searched for the term 'broadband' under the State aid policy area and collected data on January 31, 2024. The information was verified by comparing it with the published summary of European Commission decisions on State aid to broadband and mobile, last updated in January 2024 (EC, 2024). The evidence consists of State aid measures scrutinized by DG-COMP for compliance with EU legislation on State aid. Measures granted under GBER or de minimis were defined from the outset to be outside the research perimeter and were excluded from the corpus collection.

3.5.2. Data acquisition

Between 2003 and 2023, DG-COMP assessed a total of 199 State aid measures in broadband, including VHCN deployment. This dataset of 199 decision letters, comprising 3141 pages of content, was collected from the European Commission's website as of January 2024. These letters are issued in response to each Member State notification and contain information on various aspects, including case type, target area, granting authority, tender procedure, notification and decision dates, and detailed procedural information. The dataset was compiled through manual review due to the non-standardised format of the letters.

The decision letters' corpus was comprehensively combed, analysed, and appraised using conventional qualitative content analysis methodology. The supplementary material to this paper contains the data used.

3.5.3. Data validation

The 199 decision letters include 122 original cases directly concerning broadband deployment. These 122 letters, averaging 17 pages each, are our focus and constitute the main body of data. Of the remaining 77 measures, 38 cases involved extensions, prolongations, amendments, or modifications to previous notifications without changes in the governance model. Furthermore, the European Commission identified 27 cases that were not directly related to broadband deployment. These cases included mobile, submarine cables, and demand promotion (vouchers) measures. Additionally, six cases were found not to involve State aid. The remaining cases consisted of two formal investigations, two evaluation plans, one negative decision, and one withdrawn case. The final 122 measures cover 23 Member States.

3.5.4. State aid measures for broadband deployment: Key descriptive

Between 2003 and 2010, the number of annual notifications of original measures increased and reached a peak of 15 notifications. This number was maintained in 2011 and 2012, but it has significantly decreased since then. On the other hand, the number of measures involving extensions, prolongations, amendments, or modifications of previously notified measures increased between 2008 and 2012, remained constant between 2012 and 2014 and decreased thereafter.

Germany, the UK, Italy, and Spain are the countries with the highest number of original measures notified, in descending order. All of these countries notified ten or more original measures. All Member States except for Belgium, Denmark, Malta, and Luxembourg have notified this type of measure. The European Commission concluded that the single notification from Czechia did not constitute State aid. Although Belgium, Czechia, and Denmark did not notify any measures, they utilized GBER. Malta, a small country with high population density and virtually no rural areas, did not require State aid measures, including GBER. Notwithstanding, Malta was the first Member State to achieve the Digital Agenda for Europe target of 100% broadband coverage with at least 30 Mbps by 2020. Luxembourg also achieved extensive broadband deployment without relying on any form of aid.

The remainder of this section presents the analysis results of 122 original State aid cases for broadband network deployment that were notified to the European Commission between 2003 and January 2024.

3.5.5. Models of governance

During the analysed period, the implementation of State aid for broadband networks varied significantly across the EU. This resulted in a plurality of governance models despite the general trend towards multilevel governance and a common European framework applicable to State aid for deploying these networks. In some Member States, State aid measures were exclusively pursued through national plans decided by central governments, in some cases implemented centrally and in other instances implemented by subnational authorities. Subnational authorities also decide on measures for their specific territories that run concurrently with national State aid programs. The subnational measures may adopt the same design as the national plans. However, at lower territorial levels, notifications tend to take the form of individual measures rather than umbrella schemes.

Fig. 3.2 displays the number of notifications categorized by country, year, and type of measure (national or subnational), providing an overview of the dynamics of the national and subnational measures. Fig. 3 shows the cumulative evolution of the number of notifications per year and per type of measure (national or subnational). It is important to note that during the analysis period from 2003 to 2023, all countries in the sample, except for the Netherlands, submitted at least one national plan to the European Commission. Additionally, around half of the countries, including Austria, France, Germany, Italy, Lithuania, Poland, Spain, Sweden, and the UK, also submitted subnational measures.

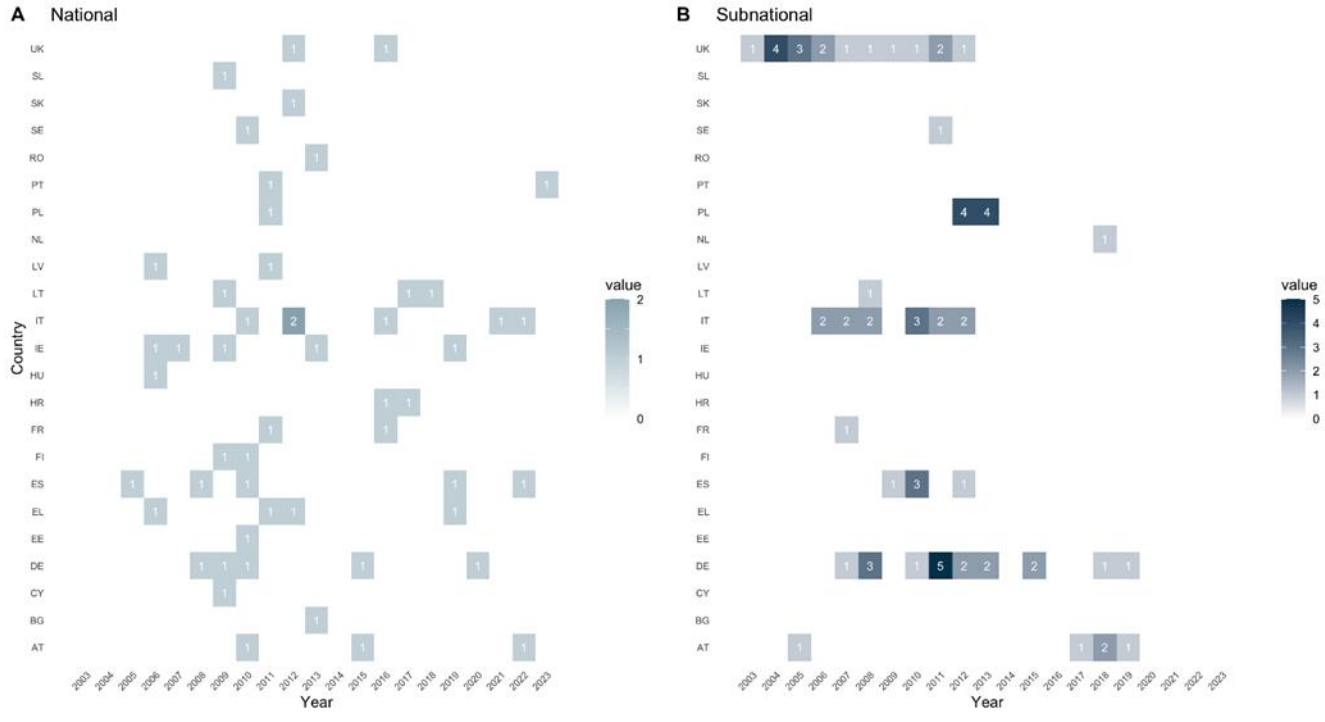


Figure 3.2. Number of notifications per year, per Member State and per type of measure (national or subnational)

Key: AT-Austria; BG-Bulgaria; CY-Cyprus; DE-Germany; EE-Estonia; EL-Greece; ES-Spain; FI-Finland; FR-France; HR-Croatia; HU-Hungary; IE- Ireland; IT-Italy; LT-Lithuania; LV-Latvia; NL-Netherlands; PL-Poland; PT-Portugal; RO-Romania; SE-Sweden; SK-Slovakia; SL-Slovenia; UK- United Kingdom.

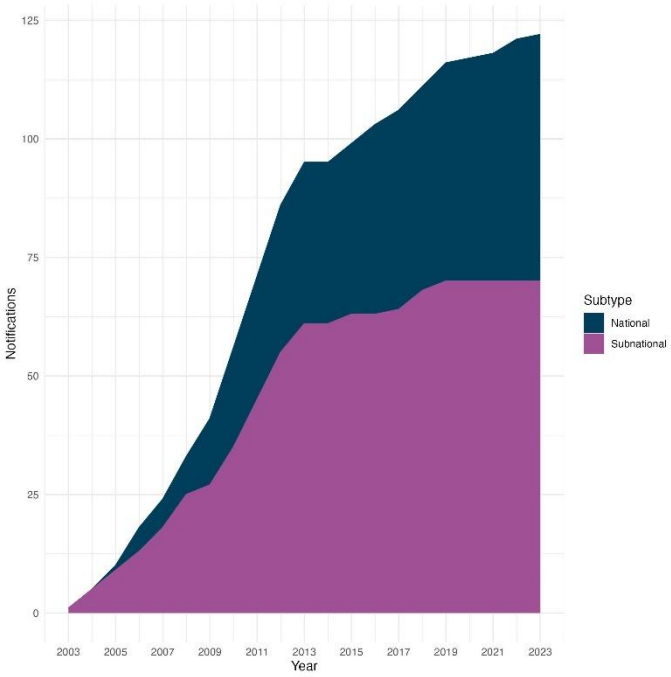


Figure 3.3. Cumulative evolution of the number of notifications per year and per type of measure (national or subnational)

During the period, subnational measures were mainly reported in the first half, with a decrease observed in the latter half. The timing and sequencing of national and subnational measures varied among countries. No subnational measures were reported after the first national measure in France, Italy, Lithuania, and the UK. Furthermore, subnational measures consistently preceded national ones, except in Spain, Poland, and Sweden.

The following subsection provides a detailed analysis of national measures, while the next one covers subnational measures.

National measures

Central governments primarily determine State aid measures for broadband deployment. Among the Member States reporting such measures, all except the Netherlands have had at least one national plan. However, there are variations in the governance models used to implement these plans across different countries, which can be categorized as either centralised or decentralised.

A slight majority of countries have adopted a centralised governance model. A generally consistent governance model was observed in countries with multiple national plans, with a few exceptions. For instance, Austria initially followed a decentralised model for its national plan but later shifted to a centralised approach. Similarly, Italy's initial measures were decentralised, but subsequent plans, particularly under the RRF, tended to be centralised. Table 3.2 provides an overview of the governance models of national State aid plans for broadband networks in countries that have notified the European Commission of such plans.

Table 3.2. Member States that have a national programme and type of governance model used for each programme

Decision-maker	Type of measure	Implementor	Governance model
Central government	**National measure**	Central government	**Centralised** **AT BG CY EE ES EL HU IE IT LT LV PT RO SK**
		Regional	**Decentralised** **AT FI IT PL**
		Regional / Municipal	**FR UK HR**
		Municipal	**DE SE SL**

Centralised models

In the most common centralised model, the central government initiates a public tender for a limited number of lots. The tender is usually administratively processed by a ministerial cabinet or a state agency supporting the government in this task. This model has been adopted in Bulgaria, Cyprus, Greece, Ireland,[5] Portugal, Romania, and Spain. Austria initially embraced a decentralised approach for its first national measure (N 336/2010) but later transitioned to a centralised model. Despite the shift, municipalities have actively participated as bidders and had projects subsidised under this measure, creating a hybrid model with municipal involvement.

State aid was directly granted to a state-owned company in Slovakia, Latvia, and Lithuania, while in Estonia, it was allocated to a non-profit organisation. The measure took an atypical form in Hungary, consisting of a tax benefit for broadband network deployment.

In Italy, the central government implemented its most recent measure (SA.63170) through Infratel Italia (Infratel), a state-owned enterprise. Infratel initiated a single tender split into lots with regional or multi-regional dimensions. The previous measure (SA.41647) involved a framework agreement between the central government and regions, which was operationalized through bilateral agreements with each region. Infratel manages the allocation of funds and serves as the sole contracting authority.

In a centralised model, the tender process can occur periodically, such as once a year, as is the case in Austria and Spain or consist of a single call in the remaining countries.

Decentralised models

Several Member States have implemented decentralised governance models in their national plans, following a multilevel governance approach. However, civil society actors have not been involved in these models. The role of subnational authorities as implementing actors may entail varying degrees of flexibility and autonomy. The subnational authorities responsible for implementation can be found at various territorial levels, ranging from regions, predominantly in federal states, to

[5] In one of the measures, the tender was not divided in lots.

municipalities or equivalent authorities. This reflects the unique context and priorities of the respective Member State.

The design of these national measures with decentralised implementation involves three key dimensions.

The first dimension concerns the presence of a coordinating or supervising body for individual projects (refer to Table 3.3). There is no such body in Federal States like Austria, Germany, Poland, Slovenia, and Sweden. However, in other countries such as Croatia, France, Italy, and the UK, this body is typically part of the central state administration and reports to a specific minister. These coordinating or supervising bodies may also be newly created specifically for managing national measures. For example, the Mission Très Haut Débit was established in France, while Broadband Delivery UK was created in the UK. In Sweden, the county administrative boards, which are at an intermediate territorial level, are responsible for coordinating and supervising the individual measures under the national scheme. In the cases of central or regional coordination or supervision, subnational authorities must submit their projects to the agency for approval before proceeding with the tender. In the UK, subnational authorities can request Broadband Delivery UK to carry out the tender on their behalf.

Table 3.3. Existence of coordinator and respective territorial tier in national measures with decentralised governance models

Coordinator	Central	**FR UK HR IT**
	Regional	**SE**
	No coordinator	**AT DE FI PL SL**

Note: The information regarding Italy is based on SA.34199: Digital Plan – Super-fast broadband.

The second dimension relates to the territorial level of the authorities responsible for implementing individual measures (refer to Table 3.4). Central government-defined programmes may be implemented in a decentralised manner at various territorial levels. In many cases, implementation is the responsibility of authorities at the intermediate territorial level, either exclusively or in conjunction with lower territorial levels. For example, intermediate territorial authorities in Austria (länder), Finland (county), Italy (region and province), and Poland (voivodship) have exclusive responsibility. In contrast, authorities at different levels in Croatia, France, and the UK share responsibility. In Croatia, it includes counties and municipalities. In France, it covers regions, departments, and communes, including groupings and associations of these authorities. In the UK, it includes devolved administrations of Northern Ireland, Scotland, and Wales, as well as local authorities and community bodies. In Germany, Slovenia, and Sweden, the authorities at the lowest territorial

level, such as municipalities, local communities, or associations of municipalities, are responsible for this competence.

Table 3.4. Implementing authority in national measures with decentralised governance models

Implementor	Regional	**AT FI IT PL**
	Regional / Municipal	**FR UK HR**
	Municipal	**DE SE SL**

Note: The information regarding Italy is based on SA.34199: Digital Plan – Super-fast broadband.

The third dimension is linked to the functions assigned and the level of delegation and autonomy granted to the implementing entities. In all cases, these entities define project specifications. They are responsible for processing them in compliance with the minimum set of guidelines defined in the national programme approved and notified to the European Commission. Several European countries, including Croatia, France, Germany, Italy, Slovenia, and the UK, offer various options for the investment or ownership model of the network to be built. These options include public, private, or public-private partnerships (PPPs). The implementing authority has the discretion to select the most suitable model. In countries such as Germany, Sweden, and the UK, implementing authorities must conduct a market analysis to justify the specific project they intend to pursue. The market analysis presents a detailed map of the area covered by the measure and provides information on future private investment plans.

Subnational schemes or individual measures

Some notifications provide justifications for measures initiated by subnational authorities after national plans have been approved. For instance, a national scheme may not fully accommodate the differences and specificities of subnational territories in terms of target areas (such as the cases of, for example, SA.28665 and SA.30705) or maximum aid amount per project authorized under the scheme (e. g., SA.32037, SA.32203, SA.33420, and SA.33869).

In most cases, subnational authorities within a Member State adopt the same governance model, resulting in internal consistency. Additionally, in some cases, subnational measures align with the model of national plans to some extent. For example, in Germany, federal states design subnational measures[6] that are then implemented by municipalities or associations of municipalities, reflecting the same decentralised governance model observed in the national plans. Similarly, in Austria, subnational

[6] Apart from the measures of the responsibility of federal states, there were two different kinds of subnational measures notified to the European Commission by Germany. One of the kinds refers to four cases (SA.32203, SA.33420, SA.33869, and SA.33869) of the responsibility of municipalities, the measure was needed because the aid amount for a particular project was higher than the maximum aid amount per single project authorized under the scheme (namely under the subnational measure of the federal state of Bayern). The other kind refers to two notifications of the responsibility of regions (SA.31729 and SA.39518).

measures are typically designed by the federal states. However, in this case, the model is centralised, with the construction of networks and corresponding aid being delegated to a wholesale company controlled by the respective federal state. In Poland, subnational measures are the responsibility of the voivodships. There are two distinct approaches to implementing these measures: one replicates the national scheme, with implementation centralised within the voivodship, while the other follows a decentralised approach, with municipalities taking charge of implementation. In the latter scenario, municipal authorities organize an open tender procedure to select an infrastructure operator. In Italy, subnational measures have been implemented by regional and provincial authorities. The regional and provincial authorities implemented these measures through an open tender process, which was sometimes divided into lots. In Spain, subnational measures are the responsibility of autonomous communities, and these authorities implement the measures. In the UK, subnational measures were determined by various local authorities, including devolved authorities in Scotland, Wales, and Northern Ireland, regional development authorities, county councils, and city councils. The decision-making authorities or agencies centralised the projects. Only one subnational measure was implemented in the other four countries (France, Lithuania, Netherlands, and Sweden).

Fig. 3.4 provides an overview of the countries with national decentralised models and subnational measures. The result is a quite balanced profile, which underscores the sheer variety of governance mechanisms under the EU State aid set-up. Other observations emerge; for instance, there is a tendency for large countries to follow a scheme tying national decentralised and subnational measures, the exception being Spain (which is a Nation-state in which devolution occurs along significantly autonomous lines).

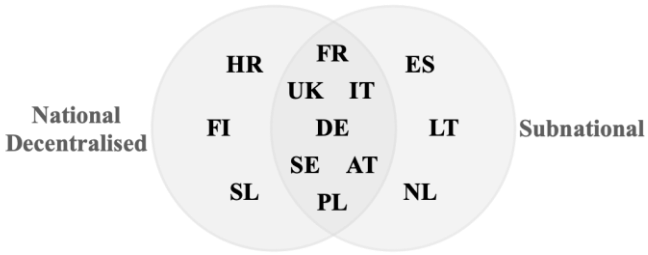


Figure 3.4. Countries with national decentralised and subnational measures

3.6. Factors behind the governance models adopted by different countries

The trend towards decentralisation in public policy processes, in line with the principles outlined in the European Charter of Local Self-Government, which was launched in the mid-1980s, has reshaped governance dynamics across the EU (Ladner et al., 2019, pp. 4–7). Decision-making and policy implementation functions are increasingly delegated to subnational authorities by central governments. However, State aid procedures for broadband deployment vary significantly among

Member States due to differences in institutional design, reflecting diverse approaches to territorial power distribution. The stability of national State aid governance models is demonstrated in each country's dynamics. Apart from Austria and Italy, countries with multiple national measures maintained their respective governance models over time.

Several factors may explain why different countries adopt different models.

3.6.1. Typology of state structures

One potential justification for this phenomenon may be associated with the generic typology of state structures (ESPON, 2006; Giovannini et al., 2014). In federal states or regionalised states, the nature of the state structure is such that there are likely to be widespread and comprehensive decision-making mechanisms at the regional level. This is reflected in the case under discussion by the decentralised model for broadband State aid measures. These states usually have subnational authorities with fairly broad powers, which not only participate in the formulation of most federal legislation, but also are responsible for the implementation of most legislation, acting as the states' principal administrators (Thielemann, 1999). In contrast, in unitary states we would expect to see the opposite relationship, with most countries having a centralised governance model. Table 3.5 confirms this presupposition by linking the typology of state structures and the governance model of national State aid measures to the deployment of broadband networks.

Table 3.5. Classification of the countries with national governance models using the typology of state structures

	National governance model of State aid for broadband deployment measures	
Typology of state structures	**Decentralised**	**Centralised**
Federal states	AT, DE	-
Regionalised unitary states	IT, PL, UK	ES
Decentralised unitary states	FI, FR, SE	LV, SK
Unitary states	SL, HR	BG, CY, EE, EL, HU, IE, LT, PT, RO

Source: Author, based on ESPON (2006) and Giovannini et al. (2014).

These topologies are deeply entrenched in the politico-institutional frameworks of different countries, making it challenging to deviate from these contexts, in which actors are embedded, when designing public policies. Some countries might deviate from the expected outcome, as is the case with Spain, which, despite being a regionalised unitary state, has adopted a centralised governance model. In Spain, controversy and tensions have arisen regarding the powers to intervene in this process. As discussed in section 3.5, the autonomous regions in Spain have actively designed their own regional State aid measures for broadband network roll-out, despite the existence of national plans. This situation has inclusive led the European Commission to warn the Spanish authorities about the potential risk associated with the autonomous regions independently notifying their own State aid schemes for broadband, potentially resulting in numerous notifications from the same Member State

(CMT, 2010). Gerli et al. (2023) captured these tensions, with a representative of a regional administration lamenting the residual role assigned to the regional government by the central government under the national measure (PEBA). This marginalisation may have driven these authorities to design their own programs. Since then, centralisation has increased, culminating in the Spanish Parliament's approval of a new Telecommunications Law in 2014, which defined broadband policy as the exclusive competence of the national government.

3.6.2. Constitutional powers

A second explanatory factor may be related to the specific competences or powers that have been explicitly granted to subnational authorities in relation to the telecommunications sector. Constitutional frameworks are the fundamental law in each country and can provide a starting point for understanding the territorial distribution of power in the telecommunications policy area. However, based on a survey conducted on March 10, 2024, using a repository of the Constitutions of each Member State of the European Union,[7] only four countries explicitly referred to the allocation of competencies in the field of telecommunications. In Austria and Germany, the federal government has exclusive jurisdiction over telecommunications policies (Erk, 2004, p. 17; Schneir & Batura, 2015, p. 163). A similar framework is also in place in Spain, which is a quasi-federal state (Romero Caro, 2022). Article 149.1.21. a of the Spanish Constitution grants exclusive jurisdiction over telecommunications policies to the central government. In Italy, according to Article 117 of the Constitution, the power regarding the area of communication[8] is a concurrent competence of the state and the regions. This data only provides information on the level of government that has competence for the decision-making process related to the telecommunication sector. It cannot be drawn from this data that the implementation of State aid measures in the sector cannot be delegated to territorial sublevels in countries where this power is not explicitly enshrined in the constitution.[9] Furthermore, it is possible that other powers may be in conflict with this one, such as the power to promote regional development, which can be exercised independently by subnational authorities.

Although constitutional provisions in Austria, Germany and Spain imply centralisation, regional governments or federal states have actively supported broadband network development since the late 1990s. In Spain, public operators or public-private partnerships have resulted from regional initiatives, including notable projects in regions such as Asturias, Catalonia, the Basque Country, Navarre, and Rioja (Ganuza & Viecens, 2011; Gerrand, 2006). Similarly, in Germany, federal states and municipalities

[7] Available at https://www.venice.coe.int/WebForms/pages/?p=01_CODICES_constitutions&lang=EN.
[8] We infer that telecommunication is included under the broader concept of communication.
[9] In Germany and Austria, there is, for example, the tradition of co-operative federalism (Benz, 2007; Faludi, 1998) or joint decision-making (Thielemann, 1999).

can adopt measures to promote the development of telecommunications infrastructure, complementing federal government initiatives (Schneir & Batura, 2015, p. 163). These initiatives may result from other concurrent powers, such as the power to promote regional development, which is typically granted to subnational entities. For instance, in Spain, case law has confirmed that local authorities can intervene in the telecommunications sector based on economic or regional development grounds (Article 149.1.13).

Each of these three countries has chosen different solutions for national State aid measures. In Germany, significant powers have been delegated to subnational authorities to implement State aid policies for broadband network rollout, which have been decided centrally. Austria has established national measures with both centralised and decentralised implementation. In contrast, Spain has adopted a centralised model. The national government asserts that broadband policy falls under its exclusive jurisdiction, particularly since the 2014 legislation aimed at curbing autonomous measures by subnational authorities.

In Italy, regions kept the power to develop their own plans since, according to the Italian Constitution, the communication sector is subject to concurrent legislation. This means that the definition of fundamental principles is reserved for the State, while detailed legislation is left to the regions.

3.6.3. Traditions of subnational participation in the telecommunication sector

In some countries, subnational authorities have a legacy of increased powers to intervene in the telecommunications market. With this gradual reinforcing path, it is inevitable that those authorities will be involved in the implementation of national measures or even in the decision to proceed autonomously with regional aid measures. This is exemplified by the case of France. France, which has implemented decentralised national measures, has started to grant competencies to subnational governments in early 1980s, empowering them to participate in the telecommunications market long before adopting national plans. In France, the Defferre Law of 1982 initiated decentralisation, transferring competencies and resources from the state to local authorities for the purpose of facilitating the deployment of cable networks. Simultaneously, Law no. 82–652 liberalised the audio-visual communication sector, allowing local commercial cable companies with local authority majority ownership to operate cable networks. The Cable Plan, also adopted in 1982, gave local authorities the power to initiate cabling of their regions with national financing (Thatcher, 1999, p. 243). This plan involved the collaboration between local authorities and central actors, such as DGT and 'Mission Câble', to ensure consistent infrastructure deployment in accordance with technical standards (Humphreys, 1985, p. 16). These powers were progressively expanded and enhanced and in 2004 Law no. 2004-575 granted local authorities the power to deploy, operate, and provide any type of

telecommunications network in the absence of private initiatives (Laurie, 2011). Eventually, in 2010, the national broadband plan, France Très Haut Débit, involved local authorities into the infrastructure deployment process.

3.6.4. Policy diffusion

Poland has implemented a telecommunications policy that is analogous to that of France, in what seems as part of a process of policy diffusion between countries. This legislative framework has been tailored to align with the country's specific circumstances and institutions. Poland's Act on Supporting the Development of Telecommunications Services and Networks, adopted on 7 May 2010, allowed local governments to construct and manage telecommunication networks using their own budgets to meet local needs when local entrepreneurs were unable to do so (Windekilde & Ladny, 2015, pp. 304–305). As a regionalised unitary state, the introduction and adoption of this policy is facilitated, despite the absence of a prior tradition of subnational authorities' intervention in the telecommunications market.

3.6.5. Regional development

The deployment of broadband networks can be viewed in a broader context as a regional development policy. This is an area of action that is best managed at the subnational level, rather than by central government. A paradigmatic example is the UK. Following almost two decades of Conservative government, during which the autonomy of the regions was diminished (Graham, 1995), both local and regional governments, the latter through the regional development agencies (RDAs), witnessed an expansion of their powers following the establishment of these agencies through the RDA Act in 1998 and the revision of the Local Government Act in 2000. The aforementioned acts bestow upon these authorities the requisite powers and responsibilities to foster economic growth within their respective regions. These authorities, imbued with the powers and responsibilities conferred upon them by the aforementioned government initiatives and the favourable institutional environment at the time, interpreted these provisions in a broad manner and initiated State aid measures for broadband network deployment at the outset of the 2000s. RDAs recognized the importance of broadband access in addressing regional economic disparities with the Northwest Development Agency's notifying the first decision registered by the European Commission on broadband deployment in 2003 (Chirico & Gaál, 2014). Since then, the devolved territories of Northern Ireland, Scotland, and Wales, as well as local authorities, have taken initiatives to support broadband deployment since the early 2000s. Once again, these traditions could not be reverted in the design of the National Broadband Scheme for the UK in 2010.

Local government acts also justify decentralised national models in Sweden. Sweden's Local Government Act of 1991 delegates the competence for granting State aid to regional self-administrative agencies called Länsstyrelserna, which are responsible for monitoring local authorities' activities (Simonsson, 2006, p. 638).

3.6.6. Institutional lock-ins

The factors we have presented in the previous subsections explain the decentralised governance models. Centralised governance models are prevalent among the 13 nations that joined the EU since 2004, with eight adopting this model (Czechia and Malta have not notified any measure, and Croatia, Poland and Slovenia have adopted decentralised models).

Greece, Ireland, and Portugal have also adopted centralised national plans despite previous subnational involvement in telecommunication development policies (Healy et al., 2022; Nunes, 2009; Troulos & Maglaris, 2011). Subnational involvement in broadband expansion was promoted by central government in Ireland and Portugal, specifically with projects such as the County and Group Broadband scheme in Ireland or the Community Broadband Networks scheme in Portugal (Nunes, 2009; Palcic et al., 2023). The scheme in Portugal aimed to showcase covered regions as examples of nationwide broadband expansion. However, the national broadband plan, which was designed a few years later, failed to consider subnational authorities as relevant implementing actors. In Ireland, limited subnational involvement may result from central controls and financial constraints (Daemen & Schaap, 2000). Additionally, the impact of austerity policies and reforms made during the Great Recession in countries under financial assistance may have also contributed to greater central control in State aid policies. Despite the attempts to promote the participation of subnational authorities in Ireland and Portugal, the existing institutions appear to have undergone only a limited degree of reform. In fact, according to the theory of historical institutionalism, the historical legacies and institutional constraints limits change (Hall & Taylor, 1996). Policy change might occur, driven by critical junctures and exogenous shocks (Baumgartner & Jones, 1993), or by gradual institutional shifts, which involve drift, layering, conversion, and displacement (Streeck & Thelen, 2005).

3.7. Discussion

When designing public policies, policymakers must take due account of the prevailing institutions. The unique context, culture, institutions, and historical legacies of a country play a crucial role in either facilitating or hindering the adoption of a specific governance model. Two significant anchors that restrict the range of potential governance models for public policy are the type of state structure and the constitutional framework in force. In countries where the constitutional framework explicitly

defines the powers of different government levels, it is challenging to deviate from these established rules.

Despite the aforementioned constraints, change is possible. Within the existing framework, national and subnational policymakers can explore various paths and mechanisms. For example, in Spain, even though the constitution clearly states that telecommunications is under the exclusive jurisdiction of the national government, regional governments have found ways to autonomously manage regional aid measures for broadband deployment within their other granted powers. Similarly, subnational authorities in Italy and Spain have engaged in opportunistic behaviors to influence policy design, regardless of their formal involvement in governance (Gerli et al., 2023). This requires robust subnational governments with adequate resources. However, the willingness of subnational governments to participate and influence national measures has often been overlooked by highly centralised national governments.

This study does not advocate for a particular governance model, as assessing the most efficient model is beyond its scope. Scholars have conducted studies on the efficiency of public intervention through State aid policy (e.g., Bourreau et al., 2023; Briglauer & Grajek, 2023). There are also ex-post evaluations of State aid broadband projects (e.g., France Stratégie, 2023; Ipsos Mori, 2018). However, to our knowledge, there has been no comparative evaluation of the effectiveness and efficiency of centralised versus decentralised governance models. Such an assessment depends on numerous independent variables, including regulatory instruments, investment incentives, legislative measures, legacies, and the competitive context (Manica, 2024). Although this study does not evaluate these policies, it is noteworthy that countries with centralised national governance models have a VHCN median coverage rate that is 25 percentage points higher than those with decentralised models, while their median percentage of the population in rural areas is only 3 percentage points higher. One scenario could be the implementation of flexible national schemes, for example, with the option of national management agencies replacing subnational authorities in the tendering process, which could be a good match in order to support different subnational authorities' interest and capacities.

In the absence of comparative evaluations, it is nevertheless possible to identify, in general terms, the advantages and disadvantages of each model. Some studies indicate a trend toward the centralisation of public interventions, which can create efficiencies in State aid management, resulting from significant economies of scale (Gerli et al., 2023). Launching a single centralised call for tenders instead of multiple calls for tenders at the regional or local level, as well as centrally monitoring the implementation of the actual network, with the corresponding savings in resources, are examples of these economies of scale. Conversely, coordinating and steering multiple actors to implement policies of the central government may result in considerable transaction costs, potentially undermining

accountability and efficiency. Furthermore, ad hoc subnational measures lacking an overarching vision may prove even more disadvantageous.

In the absence of comparative evaluations between different models, one approach to be followed by policymakers could be to test smaller solutions aligned with the institutional context and evaluate their results. This strategy has been adopted in several countries, with successive national measures (as presented in Fig. 3.2). For example, France launched a €750 million program in 2010, which was subsequently superseded by a much more ambitious €13.3 billion program four years later. Policymakers should consider different governance models and adapt them to their country's specific institutions, as it is impractical to impose a model that does not fit their circumstances, resulting in an efficient outcome. Adopting national policies with a progressively increasing scale allows for a gradual alignment with institutional anchors and the testing of the model, considering factors such as the capacity and the resources of subnational authorities.

3.8. Conclusion

In this paper, we have examined the governance models of State aid measures to support the deployment of broadband infrastructure in Europe spanning two decades. This study provides a novel and exhaustive look into the governance of the State aid measures and the governmental actors engaged in implementing digital connectivity policies. It also analyses how these models fit within countries' legislative and institutional contexts.

Two governance models have been identified for State aid national broadband network deployment measures: the centralised and the decentralised models. In the centralised model, the central government implements the measure, usually through a central agency, which promotes a public tender and takes all necessary measures for the project to be carried out properly. In the decentralised model, the government decides on the general lines of the project, and the subnational authorities implement these measures in their territory, complying with those lines. Centralised models are slightly predominant, mainly due to the countries that joined the EU since 2004. Additionally, subnational authorities may promote individual measures that are autonomous from national plans. These measures stem from the powers and competencies of the authorities that feel national plans are insufficient for the needs of their populations. However, it is important to note that most of these autonomous subnational measures were published before the central government adopted the first national plan.

Within this framework there is at least two practical implications. First, political decision-makers can become aware of the existence of different models and assess their relevance for application to their realities, considering existing institutions and the demands of subnational authorities. Second,

policymakers must take these institutional set-ups into account when designing State aid measures, being able to gradually deviate from legacies by including some aspects they consider to be more effective.

This study has two types of limitations. The first limitation is related to the scope of the cases collected. The analysis excludes measures adopted under GBER or falling under the de minimis Regulation, as well as other measures that may not have been notified to the European Commission. However, this limitation does not significantly impact the conclusions for two reasons. Firstly, GBER applies only to broadband projects decided after July 1, 2014, which covers less than half of the analysis period. Secondly, the ceiling for de minimis aid is low, at €275,000, which may exclude notifications for small and circumscribed individual measures. Furthermore, these small-scale projects have a limited impact in comparison with the measures subject to approval by the European Commission and included in the research. The inclusion of these measures would require a different research strategy regarding the data acquisition as there are no decision letters from the European Commission regarding GBER projects, and it would potentially distort the conclusions of the analysis. Another limitation concerns the interpretation of the collected data. The analysis mainly relies on information from the European Commission's decision letters. While these letters provide a general overview of the governance model and may contain limited information in some cases, the essential characteristics of the measures in each country were confirmed through complementary sources, including primary sources and scientific literature where available. Therefore, the impact of these limitations on the validity of the conclusions is expected to be minimal.

Regarding future research, three potential avenues have been identified. Firstly, reinforcing the conclusions through interviews with key stakeholders involved in these processes could provide valuable insights into implementing the measures in each governance model. Second, further research into the political decisions leading to the choice of the governance model for implementing the measure in each country would enhance understanding of the prevailing institutions behind these decisions. Lastly, assessing the efficiency and alignment with the initial objectives of measures implemented under centralised and decentralised governance models could provide valuable insights for policymaking and practice about the merits and disadvantages of each model.

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CHAPTER 4

Contrasting approaches to very high capacity network regulation and policy: a comparative analysis of France, Portugal, Spain, and the UK (2008-2020)

Abstract

Purpose - The purpose of this paper is to examine the factors that may have contributed to different levels of very high-capacity network (VHCN) coverage, with a particular focus on the role of regulation and State aid.

Design/methodology/approach - A comparative empirical study based on multiple case studies was conducted in France, Portugal, Spain, and the UK.

Findings - Although France, Portugal, and Spain initially adopted similar regulatory strategies for VHCN deployment, the outcomes differed significantly. The UK, with a more demanding regulation, achieved a residual coverage. The study highlights the importance of the regulatory approach to VHCN access in balancing private and public investment and emphasizes the importance of State aid in the policy agenda for nationwide VHCN deployment projects.

Research limitations/implications - Research on complex phenomena, such as the impact of regulation on investment or the effectiveness of State aid procedures, may focus on specific events to the detriment of others, which could bias the results.

Practical implications - The findings of this study provide insights for policymakers involved in State aid decisions and regulators by understanding the importance of timely State aid interventions, efficient governance, and the impact of regulation on investment incentives.

Originality/value - This paper extends the literature on the impact of regulation on investment incentives and State aid as a tool to complement private investment for VHCN deployment through in-depth case studies.

Keywords - Public policy, State aid, regulation, VHCN, fibre access, investment

4.1. Introduction

The Digital Agenda for Europe (DAE) was introduced by the European Commission (EC) in 2010 with the objective of ensuring fast broadband availability (over 30 Mbps) for all Europeans by 2020. To achieve this goal, the European Union (EU) allocated €15 billion to Member States between 2014 and

2020 (ECA, 2018). However, only Malta and Cyprus were able to meet the DAE target of 100% broadband coverage with at least 30 Mbps by 2020 (DESI, 2020). The EC proposed a new objective of achieving full fixed gigabit network coverage by 2030. To reach this goal, VHCN, including fibre and other high-tech technologies such as cable DOCSIS3.1, are needed. These ambitious policy objectives, namely the full fixed gigabit network coverage by 2030, may be considered somewhat artificial, since there is no evidence that, for the time being, users in countries with lower coverage of VHCN are not getting the connectivity they need. Nevertheless, these objectives can serve as benchmarks for various players, including regulators, operators, and policymakers, in defining their strategies, thereby influencing market dynamics.

While Spain and Portugal have made significant progress in VHCN coverage[10], ranking 4th and 7th respectively with over 86% of households covered, in 2020, France and the UK are lagging behind, ranking 18th with just over 50% coverage, and penultimate with only 25% coverage, respectively (EC, 2021b). The differences in coverage can be explained by several factors, including market competition, population density, urbanization, labour costs, demand for communication services, and the legacy of network infrastructures (Beck et al., 2014, p. 21). Abrardi and Cambini (2019) suggest that regulation can also promote or delay the deployment of VHCN. Despite the existence of a common EU regulatory framework, there are minor differences in regulations and policies among Member States. France, Portugal, and Spain have adopted a regulatory approach that heavily relies on symmetric regulation[11] to promote VHCN deployment. This is achieved through access to civil infrastructure and in-building wiring, which is complemented by increased obligations on access to civil infrastructure for the significant market power (SMP) operator (Shortall and Cave, 2015). In contrast, the UK has focused on operational separation through non-discriminatory access to Openreach's network. France, Portugal, and Spain have also been recognized for their ambitious State aid policies to bridge the digital divide between rural[12] and urban areas (EC, 2021a). Briglauer and Gugler (2013) highlight a regulatory controversy in Europe regarding whether to subject emerging fibre deployment to ex-ante regulation. France, Portugal, and Spain have refrained from imposing fibre access obligations to avoid discouraging investment in the initial phase, particularly by the SMP operator, and to promote co-investment agreements (Shortall and Cave, 2015). France has imposed the symmetric 'mutualization of access' obligation in less populated areas, while Spain has only required virtual unbundled local access (VULA)

[10] Coverage corresponds to the percentage of households passed by individual operators using any fixed VHCN. The technologies considered are fibre to the home (FTTH), fibre to the building (FTTB) and cable DOCSIS3.1 (EC, 2021b).

[11] Asymmetric regulation applies only to the SMP operator whereas symmetric regulation is applicable to all stakeholders.

[12] Rural areas are defined using the Corine land cover database, and creates a database of population and land type in every square kilometre across Europe. Households in square kilometres with a population of less than one hundred are classified as rural. The remaining areas are classified as urban (EC, 2021b).

obligations for Telefónica in less populated areas in 2016. The UK was the first EU country to impose VULA in 2010.

The article seeks to explain to which extent regulatory and policy variations can explain the differences in VHCN coverage among France, Portugal, Spain, and the UK. While coverage is not the sole metric for assessing investment and the quality of network infrastructure, the objective is to utilise this metric, as stated in the EU policy objectives. France, Portugal, and Spain were selected due to their comparable regulations and State aid policies concerning access to civil infrastructures and fibre, with some nuances for France. In contrast, the UK, has a distinct regulatory approach that imposes demanding obligations, including operational separation and VULA access, making it an extreme case. State aid has been used in these countries to reduce the digital divide between rural and urban network coverage.

The literature on regulation, investment, and State aid in VHCN is often analysed through quantitative methods with the aim of identifying correlations between independent variables and the dependent variable. However, this approach fails to provide an in-depth insight into the specific circumstances, legacies, institutions, contexts, and dynamics of the analysed Member States, which cannot be quantified. To address this limitation, we use four case studies and a comparative methodology.

The article proceeds with a review of previous research on VHCN regulation, investment incentives, and State aid in Section 4.2. The methodology used for analysing the research question is described in Section 4.3. Section 4.4 provides a detailed examination of regulation, industry dynamics, and State aid in France, Portugal, Spain, and the UK. Section 4.5 discusses the findings, followed by an examination of the research's implications for policymakers in Section 4.6. Finally, Section 4.7 outlines the research's limitations and Section 4.8 concludes.

4.2. Related literature

This paper addresses two main streams of literature related to investments in VHCN. The first stream examines the impact of access regulation on private investment, including co-investment. The second stream analyses public investment in VHCN, specifically through State aid. Additionally, there is a third stream of research that estimates the investment gaps for the deployment of VHCN.

Over the past two decades, research has contributed to a better understanding of the various socioeconomic, demographic, and economic factors that influence the deployment of VHCN. Studies by Koutroumpis (2009), Gruber and Koutroumpis (2011), and Gruber et al. (2014) have shed light on

this topic[13]. Additionally, Queder (2020) evaluated the competition dynamics exerted by cable networks on VHCN deployment. Bouckaert et al. (2010) and Herrera-González and García-Arribas (2014) have suggested that inter-platform competition significantly drives broadband penetration, which raises questions about the necessity of extensive mandatory access obligations. Vogelsang (2017) further concludes that if the objective is VHCN investment, fibre access should not be heavily regulated. Briglauer and Cambini (2017) propose a deregulatory approach after finding a negative impact of ex-ante access regulation and service-based competition on VHCN investment incentives and deployment. In addition, Briglauer et al. (2018) conclude that more stringent access regulation for both the legacy and the fibre networks harms investments by historical telecom operators. Bourreau et al. (2013) demonstrate that co-investment increases VHCN geographical coverage when accompanied by high retail service differentiation or significant cost savings. They also find that mandated access to VHCN reduces incentives for co-investment. Sidak and Vassallo (2015) report that other regulatory measures, such as the functional separation of British Telecom (BT), have negative long-term effects on telecommunications investment and competitiveness.

In rural areas, profitability is limited due to high deployment costs and a small number of potential subscribers (Cambini and Jiang, 2009; Salemink et al., 2015). Cave and Martin (2010) note that governments are interested in allocating public funds to promote VHCN investments and discuss various intervention choices. Gómez-Barroso and Feijóo (2012) identify a shift in the motivations for State aid, from a corrective conception to one based on the importance of the common good. Market investment falls short of the required investments, particularly in rural areas, and public investment is needed to fill the gap left by private investors. Briglauer and Gugler (2013) propose that deregulation and/or State aid-driven approaches could increase coverage, with the effectiveness and efficiency of State aid for new broadband networks, in OECD member states, being assessed by Briglauer and Grajek (2023). However, there is still a research gap in understanding the impact of State aid on VHCN deployment (Briglauer et al., 2015). Although State aid approved by the EC reached €39 billion by 2018 (Bourreau et al., 2020a), Feijóo et al. (2018) argue that additional public aid would be necessary to achieve the DAE 2020 objectives. The analysis of State aid includes multilevel governance, government quality and capacity, and coordination among different actors. These aspects have been analysed in various cases, such as the Italian broadband network and the BDUK in the UK (Matteucci, 2019; Gerli et al., 2020).

Finally, several scholars have estimated the costs required to achieve the DAE targets. Bock and Wilms (2016) estimated that an investment of €307 billion would be necessary to deploy fibre to all

[13] Mack et al. (2023) conducted a systematic literature review of the quantitative social science research on broadband Internet technology in rural areas.

EU households. Hätönen (2011) estimated that meeting the targets for full coverage in the EU would require between €73 and €221 billion, based on different scenarios depending on speed and access requirements. According to Ferrandis et al. (2021), the EU needs to invest €260 billion to meet its 2025 broadband targets, of which private operators are expected to cover only a third.

4.3. Methodology

This article investigates the factors that contribute to varying levels of VHCN coverage, with a specific focus on the role of regulation and State aid. The study employs a qualitative analysis based on the comparative method and a small number of comparable cases (small-N research strategy) for its depth (Lijphart, 1971, 1975; Yin, 2014). A hybrid research strategy is used, with most-similar (France, Portugal, and Spain) and most-different cases (the UK) (Przeworski and Teune, 1970).

Following Marsh and McConnell's (2010) approach, a wide range of secondary data was collected through multiple document analyses between January and May 2023. Data on regulatory obligations and market dynamics was collected from the CIRCABC database[14] and on State aid measures from the DGCOMP database[15]. Statistical information was obtained from the websites of the sectorial regulator in each country, namely Autoridade Nacional de Comunicações (ANACOM) in Portugal, Autorité de Régulation des Communications Électroniques, des Postes et de la distribution de la presse (ARCEP) in France, Comisión Nacional de los Mercados y la Competencia (CNMC) in Spain, and the Office of Communications (Ofcom) in the UK. General statistical information was collected from Eurostat. This was complemented with data from scientific literature and consultancy reports.

4.4. Analysis

4.4.1. Regulatory and legislative framework

The dynamics and choices made by operators and policy actors is crucially influenced by the regulatory and legislative framework. Although there is a common regulatory framework defined at the EU level, each Member State has the flexibility to adapt regulations to suit its unique market characteristics, in line with the subsidiarity principle. Therefore, regulation is adjusted to suit specific market conditions and dynamics, which are in turn influenced by the regulatory environment.

[14] Available at https://circabc.europa.eu/ui/group/2328c58f-1fed-4402-a6cc-0f0237699dc3/library/a943382e-4c71-4297-817e-f49c443d3165.
[15] Available at https://competition-cases.ec.europa.eu/search?caseInstrument=SA&sortField=caseLastDecisionDate&sortOrder=DESC.

France

In June 2008, the French regulator (ARCEP) notified the EC about its broadband market analysis. The analysis included an obligation for France Télécom to provide access to its civil infrastructure. During the same period, a bill was being debated in France that would mandate symmetric sharing of in-building wiring. This bill was eventually published as the 'Loi de Modernisation de l'Économie' in August 2008. ARCEP concluded that it was unnecessary to regulate France Télécom's fibre network, considering the symmetric obligation imposed by national law and the fact that France Télécom would be asymmetrically obliged to grant access to its civil infrastructure.

In 2010, France defined principles for symmetric access to VHCN outside of 'very densely populated areas'[16]. These principles required building operators to establish a concentration point covering a minimum of 300 lines and to provide fibre backhaul between this point and the access seeker network when it covers less than 1000 lines. This constituted a symmetric fibre access obligation in practice. To prevent building operators from limiting the deployment of VHCN to only a small part of a given area, ARCEP has mandated that they cover the entire area of the concentration point within 2 to 5 years, depending on local characteristics. This creates an investment obligation. The deployment of VHCN requires operators to follow co-investment rules. Co-investment rules were also stipulated, requiring any operator planning to deploy VHCN to inform other operators and allow them to share the cost of the investment in exchange for long-term rights to the newly deployed infrastructure (Aimene et al., 2019).

In January 2011, the French government invited operators to express their interest in investing in specific municipalities within less densely populated areas for the next five years. Municipalities with the interest of at least one private operator were classified as less densely populated areas of private initiative, accounting for approximately 14.2 million households. For the remaining less dense areas, which constitute 16.5 million households, public intervention was expected to drive investment. Only Orange and SFR made significant commitments (ARCEP, 2020, p. 40; Bourreau et al., 2020b).

In the market analyses notified in May 2011, 2013, 2017, and 2020, ARCEP did not impose asymmetric fibre access obligations, as symmetrical regulation was intended to promote co-investment.

Portugal

Portugal Telecom was obliged to provide access to its ducts and poles since the mid-1990s. However, it was only in 2005 that ANACOM, the Portuguese regulatory authority, mandated the

[16] The general principles applied overall French territory and in very dense areas were notified in 2009. In very dense areas, only in-building wiring sharing is mandatory. Very densely populated areas correspond to approximately 6.5 million households with the remaining areas accounting for 30.7 million households (ARCEP, 2020, p. 40).

publication of a reference offer for duct access. This obligation was extended to poles in 2010. In December 2008, ANACOM notified the EC of the broadband market analysis. In this analysis, ANACOM has concluded that it was not appropriate to impose fibre access obligations. This was due to the effective functioning of the regulation for duct access and the recent rollout of fibre. The Portuguese government also approved legislation in 2009 to facilitate in-building infrastructure sharing and mandate symmetric access to civil infrastructure owned by any company, including operators and utilities.

In July 2016, ANACOM notified the EC of a new broadband market analysis. In this analysis, ANACOM maintained its decision not to impose fibre access regulation. ANACOM justified this decision based on the proportionality principle, taking into account market dynamics and the potential impact on investment decisions in less densely populated areas. ANACOM maintained its decision despite the EC's recommendation following a phase II investigation.

Spain

In October 2008, the Spanish regulatory authority CNMC notified the EC of its broadband market analysis. The analysis raised serious doubts and was subsequently amended by CNMC in December 2008. In the revised measure, CNMC proposed to impose bitstream access only for speeds up to 30 Mbps. The argument was made that it would be disproportionate to require access for speeds above 30 Mbps, as the demand for high-speed broadband was expected to be limited during the review period. However, the EC expressed concerns about the absence of remedies for offers with speeds above 30 Mbps and urged CNMC to reconsider imposing remedies for these wholesale products. CNMC also imposed access to civil infrastructure on Telefónica. Additionally, CNMC decided that Telefónica should not offer VHCN retail products until CNMC confirmed the effective availability of access to civil infrastructure.

In 2008, CNMC imposed symmetric obligations on in-building infrastructure. Similar to France, CNMC believed it was reasonable to require access at points located further away from buildings, especially in areas with low population density. In November 2015, CNMC imposed a geographical-based obligation of virtual access (VULA-type products) on Telefónica, removing the speed cap of 30 Mbps from the wholesale offer.

UK

In 2006, Ofcom, the UK's electronic communications regulator, conducted a strategic review of the telecommunications sector. As part of this review, BT made binding commitments to operational separation (Ofcom, 2005). BT was to create a separate local access division called Openreach and redesign its business processes to treat orders from its own affiliated BT retailer and all other retailers in exactly the same way.

In March 2010, Ofcom informed the EC of the VULA obligation to regulate fibre and mandated access to physical infrastructure, including duct and pole access. Symmetric access to physical infrastructure in the UK, implementing Directive 2014/61/EU, was only imposed in 2016 under the Communications (Access to Infrastructure) Regulations 2016.

Table 4.1 provides an overview of the regulatory and legislative framework for VHCN in France, Portugal, Spain, and the UK.

Table 4.1. Systematization of the regulatory and legislative framework for VHCN in France, Portugal, Spain, and the UK

Country	Access to civil infrastructure		Access to fibre		Symmetric access to in-building wiring	Co-investment rules
	Asymmetric	Symmetric	Asymmetric	Symmetric		
FR	2008	With BCRD	-	2010 (outside 'very densely populated areas')	2008	2010
PT	2005	2009	-	-	2009	-
ES	2008	With BCRD	2008: *Bitstream* up to 30 Mbps 2017: VULA except for 66 municipalities	-	2008	-
UK	2010	2016	2010	-	2016	-

Sources: Created by author.

Note: BCRD: Broadband Cost Reduction Directive (Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014).

4.4.2. Market structure and dynamics

In late 2008, mass-market deployments of VHCN began in France, Portugal, and Spain, each exhibiting distinct market characteristics. Despite their differences, all three countries recognized the importance of deploying fibre-based VHCN and had access to civil infrastructure. The UK took a different approach, focusing on xDSL technologies. It was not until the end of the second decade of the 21st century that the UK observed mass investments in fibre.

To comprehend the dynamics and strategies followed by operators towards VHCN investments, it is relevant to understand market developments in those countries.

France

In 2008, Orange was the dominant player in the electronic communications market in France, while Numericable was the largest cable operator (Goff and Rojas, 2014). Orange offered a commercial wholesale fibre service, while Numericable provided fibre-optic deployment services to other operators, promoting competition in the market. SFR, the second-largest mobile operator, acquired the majority share of Neuf Cegetel, an alternative fixed operator, enabling the provision of mobile, fixed, broadband, and television services. After being acquired by Numericable in 2014, SFR became the second-largest fixed broadband network. The acquisition was subject to a commitment to provide

access to its cable network. Bouygues Telecom, historically the third-largest mobile operator, owned a fixed broadband network (Goff and Rojas, 2014). The fourth operator, Free, differentiated itself by offering innovative features at competitive prices. In 2010, Free Mobile entered the market, increasing market dynamics.

Since 2010, co-investment in fibre networks has been mandatory for all operators (ARCEP, 2010). Several co-investment agreements have been signed, including those between SFR and Bouygues Telecom in 2010[17], Orange and SFR in 2011 to cover 9.8 million households, which was updated in 2018 to cover 13.7 million households, and Orange and Free and Orange and Bouygues, with Orange being the leading operator (Bourreau et al., 2020b).

At the end of 2020, fibre coverage was available to approximately 24.2 million households. Orange accounted for more than 50% of fibre lines, followed by SFR with around 20% (ARCEP, 2022). The remaining lines were distributed among several operators, particularly in less densely populated areas of public initiative (see Figure 4.1). It appears that alternative operators were adopting a 'wait and see' strategy, choosing to benefit from Orange's investments through mutualisation rather than making significant individual investments. Orange's presence is most noticeable in densely populated areas, as well as in less densely populated areas of private initiative. Multiple operators are deploying VHCN with comparable market shares in less densely populated areas of public initiative.

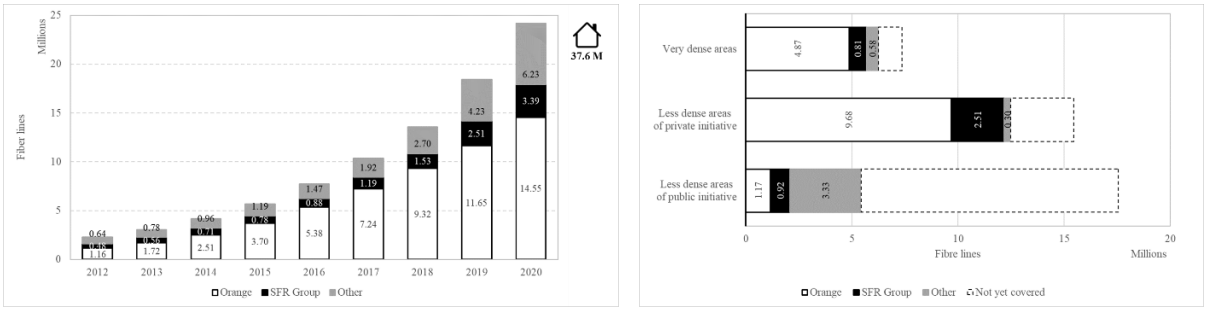


Figure 4.1. (a) Evolution of fibre deployment in France from 2012 to 2020; (b) Fibre deployment in 2020 by area (own elaboration based on ARCEP – Observatoire Haut et Très Haut Débit)

Sources: Created by author.

Note: The total of the individual operator values in Fig. 1(b) does not match the values in Fig. 1(a) because the 'Others' column in the former includes the deployments of Orange and SFR Group in areas of public initiative.

In contrast, cable deployments in France experienced slower growth, with only a one million household increase in coverage between 2012 and 2020, reaching a total coverage of 9.5 million households, which represents 28% of the total households. The upgrade of the cable network to

[17] The acquisition of SFR by Altice/Numericable in 2014 disrupted the agreement. However, the competition authority required SFR to commit to continuing its fibre co-investment agreement.

DOCSIS 3.x was gradual during this period, with most of the cable network capable of providing 100 Mbps by 2020 (ARCEP, 2022).

Portugal

In 2008, Portugal had several major telecommunications operators, including Portugal Telecom (PT), Sonaecom, Cabovisão, and Vodafone. PT was the historical operator with significant copper, cable, and mobile operations. Sonaecom and Vodafone operated as mobile and fixed operators using copper local loop unbundling wholesale offers from PT. Cabovisão had a cable network that covered 900,000 households.

In 2006, a hostile bid by Sonaecom led to the emergence of a new competitor, ZON, as a spin-off of PT's cable network. ZON was the leading provider of pay-TV and broadband services, covering 48% of households. Following the spin-off, PT's market share in the broadband market decreased from 70.1% in July 2007 to 40.7% in December 2008. To counteract this, PT invested in fibre, a future-proof technology capable of providing high speeds comparable to cable networks. Other operators also followed PT's strategy and shifted away from investments in ADSL over copper loops. By 2008, offers of up to 100 Mbps were available in the market due to fibre deployments.

In 2013, DSTelecom and Fibroglobal began operating their open access subsidized fibre networks in rural areas. In 2014, ZON and Sonaecom merged, creating synergies by combining a cable operator lacking mobile services with a group that owned the third-largest mobile and fixed operations[18]. As a result of this merger, Vodafone exercised an option to buy out Sonaecom's fibre network in 2016 (Bourreau et al., 2020b). In 2014, PT faced financial difficulties due to the bankruptcy of one of its strategic shareholders. In June 2015, Altice acquired PT, which had previously acquired Cabovisão in 2012. As part of the merger commitments, Altice was required by the EC to divest Cabovisão. Cabovisão was subsequently acquired by an investment fund and has been part of the Más Móvil Spanish group since 2019.

Several co-investment agreements for VHCN deployment have been established (Bourreau et al., 2020b). In 2010, Vodafone and Sonaecom agreed to cover 400,000 households. In 2014, Altice and Vodafone entered into an agreement targeting 900,000 households. In 2017, Vodafone and NOS announced a co-investment in fibre infrastructure to reach 2.6 million households. In 2019, an additional agreement was reached involving Vodafone, NOS, and DSTelecom to cover up to an additional 1.2 million households.

In Portugal, the number of fibre lines exceeds the number of households, indicating that some households are covered by multiple fibre networks (Figure 4.2). At the end of 2020, fibre coverage had

[18] The merger has resulted in NOS.

reached 83.8%, while cable coverage, mostly provided by NOS, covered 58% of the country's households. Overall, Portuguese VHCN coverage was 88.1% by the end of 2020.

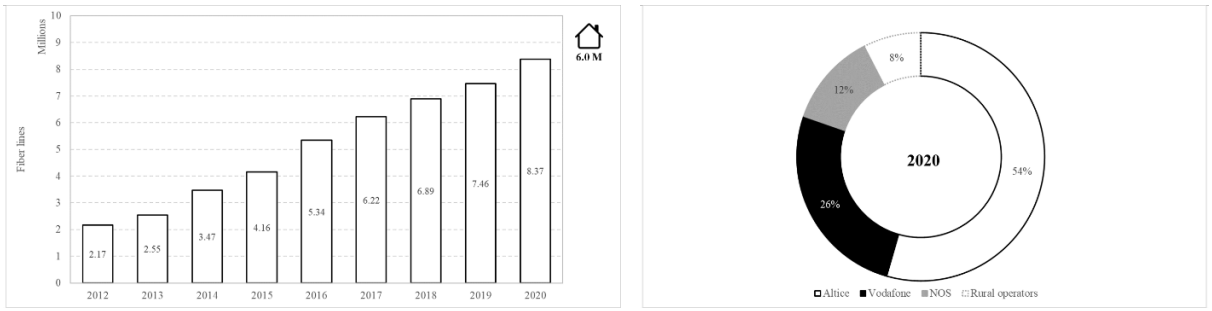


Figure 4.2. (a) Evolution of fibre deployment in Portugal from 2012 to 2020 (own elaboration based on ANACOM's data); (b) Proportion of fibre lines in 2020 per operator (own estimation based on the company's financial reports and accounts).

Sources: Created by author.

Spain

The deployment of VHCN began in Spain in late 2008, with major cable operators such as ONO, Euskaltel, and R Cable upgrading their networks and launching the first offers of 50 Mbps and 100 Mbps in the market. In 2014, Telefónica was authorized by CNMC to start offering retail fibre services on a commercial basis (Herrera-González and García-Arribas, 2014). By the end of 2013, Telefónica had provided nearly all existing fibre lines and planned to reach 8 million households by the end of 2014. Jazztel began deploying VHCN in 2013, while Orange and Vodafone were also implementing their own plans. The deployment of VHCN gained momentum in 2014, following co-investment agreements between Jazztel and Telefónica for 3 million households, and between Orange and Vodafone for 6 million households (Herrera-González and García-Arribas, 2014).

In March 2014, Vodafone acquired ONO, gaining access to the largest VHCN in Spain, which covered 7.2 million households (Herrera-González and García-Arribas, 2014). Later, Vodafone offered bitstream access to Orange on ONO's network. In the same year, Orange's acquisition of Jazztel was approved with commitments. In response to these market dynamics, Orange and Más Móvil reached an agreement in 2016 (which was extended in 2018 and 2019). Orange offered bitstream access to Más Móvil and agreed to a reciprocal agreement to cover 4.4 million households (Bourreau et al., 2020b). In 2016, Telefónica and Orange established commercial fibre-sharing agreements, which were also extended in 2018. In 2017, Telefónica and Vodafone established a similar agreement (Bourreau et al., 2020b). In 2018, Más Móvil and Vodafone reached a reciprocal access agreement for 1.9 million households (Bourreau et al., 2020b). In 2020, Más Móvil and Orange agreed to jointly deploy 2.75 million new fibre accesses.

In 2016, CNMC mandated wholesale access to fibre in areas where effective competition was not expected to emerge. This was imposed on a commercial basis in 66 municipalities, which corresponds

to 35% of Spanish households. It is important to note that VHCN coverage was already high (62.8%) when this measure was imposed, and the coverage of rural areas was being pursued with State aid.

Spain has particularly high fibre deployment rates (see Figure 4.3). Telefónica's Movistar deployed the largest share of fibre lines at 43%, followed by Orange at 26% and Más Móvil at 15%. However, the pace of deployment for alternative operators was slowing down with Vodafone relying on ONO's network and regulated access to Telefónica's fibre.

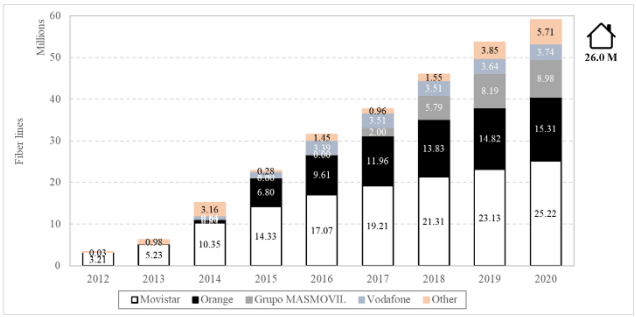


Figure 4.3. Evolution of fibre deployment in Spain from 2012 to 2020 (own elaboration based on CNMC data).

Sources: Created by author.

The provided values do not include the fibre lines that each operator can access through co-investment agreements or the regulated Movistar (Telefónica) fibre network.

Cable network deployment in Spain has been relatively minimal from 2012 to 2020, with only 0.5 million new households covered, resulting in a total of 10.1 million households covered by 2020 (48.9% coverage).

UK

In 2008, Virgin Media, the only cable operator in the UK, covering 46% of households, began offering services with data speeds that surpassed those of BT's copper network. This may have prompted a competitive response from BT, which announced the retail prices for its own super-fast service in January 2010, with speeds of at least 30 Mbit/s. However, BT's investment in VHCN deployment through its wholesale division, Openreach, has been limited. In 2018, BT announced plans to deploy full-fibre networks to up to three million premises, representing 10% coverage, by 2020. Other companies, including CityFiber, Hyperoptic, and TalkTalk, were also investing in VHCN, primarily in urban areas, and competing with BT and Virgin Media. Additionally, Virgin Media has announced plans to extend its network to cover up to 17 million premises, which represents 57% coverage, by 2019 (Ofcom, 2018, p. 93). Notwithstanding these projections, the actual number of premises covered remains relatively low (Figure 4.4).

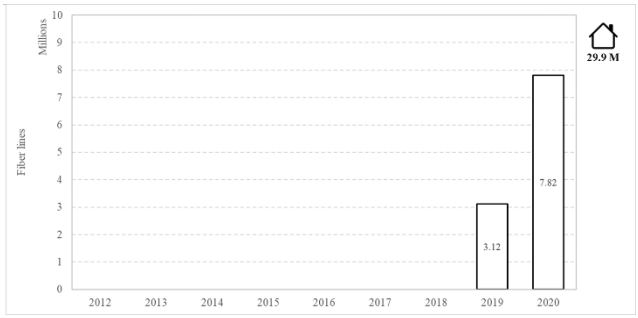


Figure 4.4. Evolution of fibre deployment in the UK from 2012 to 2020 (own elaboration based on data from EC, 2021b).

Sources: Created by author.

In the UK, the transition to DOCSIS 3.1 has also been slower than in other countries, with only 16% of cable lines upgraded to this technology.

4.4.3. Cost factors

Population density, dwelling types, and degree of urbanization

There are three crucial factors that affect unit costs for VHCN deployment.

Firstly, France, Portugal, and Spain have similar overall population densities, which are very close to the average EU population density of 109 inhabitants per square kilometre (94 for Spain, 106 for France, and 113 for Portugal). In contrast, the UK has a much higher population density of 275 inhabitants per square kilometre.

Secondly, according to Table 4.2, France has a higher proportion of population living in rural areas (33.1%) compared to the UK (12.4%), Spain (25.9%), and Portugal (26.1%). This suggests that France may encounter more difficulties in deploying VHCN due to the economies of density (Mancuso, 2012; Ng, 2012).

Table 4.2. Distribution of population by degree of urbanisation and type of dwelling

	Cities				Towns and suburbs				Rural areas			
	ES	FR	PT	UK	ES	FR	PT	UK	ES	FR	PT	UK
Total	**50.7%**	**47.6%**	**44.5%**	**58.7%**	**23.4%**	**19.3%**	**29.4%**	**28.8%**	**25.9%**	**33.1%**	**26.1%**	**12.4%**
House	7.9%	21.0%	15.3%	46.9%	9.1%	13.9%	16.3%	26.0%	17.8%	31.1%	22.6%	11.9%
Flat	42.7%	26.6%	29.2%	11.6%	14.2%	5.3%	13.0%	2.8%	7.9%	2.0%	3.5%	0.4%

Sources: Created by author.

Data from 2018 (last date with information for all four countries). Sources: Created by author, based on Eurostat: https://ec.europa.eu/eurostat/databrowser/view/ilc_lvho01__custom_9927854/default/table?lang=en

Finally, it appears that implementing VHCN in France may be more challenging and costly than in Portugal, Spain, or the UK due to the higher percentage of individuals residing in rural homes (31.1% in France compared to 11.9% in the UK, 17.8% in Spain, and 22.6% in Portugal).

Labour costs

The deployment of VHCN involves several cost elements, including equipment costs, civil works, and labour costs. When duct and pole access is widely available, labour costs, specifically cable deployment, become more significant (Beck et al., 2014). Table 4.3 shows that France has the highest hourly labour costs compared to Portugal and Spain, with more than double that of Portugal. The UK stands in an intermediary position.

Table 4.3. Evolution of labour cost levels in 'Industry, construction and services (except public administration, defence, compulsory social security)' in 2008, 2012, and 2016

	2008	2012	2016
France	31.2€	34.3€	34.6€
Portugal	12.2€	13.3€	13.6€
Spain	19.4€	21.1€	21.2€
UK	23.7€	25.0€	27.9€

Sources: Created by author, based on Eurostat:
https://ec.europa.eu/eurostat/databrowser/view/lc_lci_lev__custom_9929552/default/table?lang=en

4.4.4. State aid

State aid is one of the tools used by central and local authorities to promote public policies aimed at bridging the digital divide. The higher costs of rural coverage are usually subsidized by State aid. The smaller the investment incentive, the larger the government contribution.

France

In December 2009, France passed the Loi Pintat, a law aimed at promoting the development of VHCN in areas of low population density. The law also created the Digital Development Fund for Territories, managed by the Caisse des Dépôts et Consignations in collaboration with a committee composed of representatives from the government, operators, and local authorities (Loridan-Baudrier, 2014, p. 231). To implement this law, the government published the Très Haut Débit Plan in June 2010. The plan involved €750 million and was implemented by local authorities (départements), which selected the operator responsible for developing the network in their regions.

In 2013, the plan was revised with the aim of achieving nationwide fibre coverage by 2022, requiring €13.3 billion of public investment. Operators have committed to cover 57% of the population with private investment of €6 to €7 billion. Implementation of the plan has been delegated to the departments. A central task force, the 'Mission très haut debit', has been set up to coordinate network deployment at regional level. This task force provides economic, technical, and operational support to local authorities, evaluates projects submitted by local authorities, and monitors their implementation. In order to guarantee specific public financial support, local authorities refrained from launching projects in areas already served by the market. Trilateral agreements have been signed

between the State, local authorities, and operators to ensure that operators meet their deployment commitments. By the end of 2013, 47 local network projects had been notified to the central authorities.

Portugal

The Portuguese government has identified investment in VHCN as a strategic priority for the country (Council of Ministers Resolution No. 120/2008 of July 30). To achieve this, State aid has been provided in areas where market players have not found favourable operating conditions to provide VHCN. As a result, five public tenders were launched in 2009 for the deployment of VHCN in these areas. The initiative covered 138 municipalities with a total population of 1 million and offered €106 million in aid, with a maximum aid intensity of 70%. Bidders were required to achieve a minimum coverage of 50% of the population of each municipality. The process was supervised by the Secretary of State for Communications and supported by ANACOM. The tenders were won by wholesale-only operators Fibroglobal and DSTelecom. The networks were successfully implemented within three years, except in Madeira where funding was not available.

Spain

The Spanish government launched the 'Programa de Extension de Banda Ancha' (PEBA) in 2013 to expand VHCN coverage in rural areas. Prior to PEBA, the Spanish authorities had developed State aid measures, partly for basic broadband and VHCN deployment. PEBA was initially planned for 2013-2015 and included €60 million in grants and €300 million in interest-free loans, with an aid intensity of 35%. The duration of the measure was extended to 2020 by the General Block Exemption Regulation, with no financial impact. In addition, in 2019, the program was extended until 2022, with a budget of €400 million in grants and a maximum aid intensity of 100%.

The government consults the market annually under the PEBA framework to identify areas lacking private investments in fibre. Operators are invited to submit projects to cover the municipalities with minimal specified requirements. By 2018, PEBA had provided €414 million for 628 municipal projects (Gerli and Whalley, 2020).

In addition to PEBA, regional notifications have also played a role in promoting broadband deployment in Spain. ConnectAragón and the broadband rollout in Galicia received €36 million and around €68 million respectively.

UK

Public policies to support VHCN have been in place in the UK since the early 2000s, through the devolved territories, local authorities, and regional development agencies. In 2012, central government launched the National Broadband Scheme for the UK. This scheme, overseen by Building Digital UK (BDUK), was established in response to the proliferation of broadband projects across the country, planned at both local and community level. The National Broadband Scheme empowered

local authorities to design and deliver their own broadband projects under the supervision of the BDUK. Granting authorities were also given the autonomy to run their own tendering procedures or to follow the standard procedures developed by BDUK. The financing of these projects could include a combination of State aid and municipal financing (Gerli et al., 2023). One new national measure was adopted in 2016. In total, the measures covered 5.3 million households and businesses.

Table 4.4 summarises the State aid data in France, Portugal, Spain, and the UK. Although the time periods and coverage may vary, there is a significant difference between the allocated budget and the reported expenditure. This discrepancy raises concerns about the adequacy of the conditions attached to State aid measure. The use of public funds may not effectively promote the interests of private investors, even if the conditions are met.

Table 4.4. Measures regarding State aid to VHCN deployment

	Number of aid measures		Budget		Total expenditure reported (2014-2019)	Percentage of the budget used
	Approved by EC decision (2013-2020)	Under GBER (2014-2020)	Approved by EC decision (2013-2020)	Under GBER (2014-2020)		
France	1	2	13 000M€	783M€	877M€	6%
Portugal	1	0	106M€	0M€	106M€	100%
Spain	2	33	760M€	1 327M€	371M€	18%
UK	3	16	635M€	1 301M€	1 720M€	89%

Source: Created by author, based on EC (2021a).

4.4.5. Outcome

The DESI 2020 report highlights Spain's exceptional VHCN coverage, which reached 92% in 2020. Portugal also demonstrated high VHCN coverage at 87%. In contrast, France's coverage lags at 53%, which is in line with the EU average and almost half of the coverage achieved in Spain and Portugal. The UK covered only 25% of households with VHCN. More related to State aid, rural VHCN coverage was above 60% in Portugal and Spain and below 20% in France and the UK (EC, 2020, p. 11).

As there is no publicly available information on investment in VHCN per country, coverage is the only comprehensive indicator of investment.

4.5. Discussion

Section 4.4 analysis reveals three main factors that contribute to lower VHCN coverage in France and the UK compared to Portugal and Spain: higher deployment costs, fewer regulatory incentives for deployment, and slower implementation of State aid measures.

4.5.1. Deployment costs

France initially estimated that it would cost €15 billion to cover 80% of the population with fibre networks, with €6 billion of public financing required. However, it appears that the regulatory and policy rules established by French actors did not adequately address this investment challenge. Although deployment costs in France are relatively higher due to factors such as population density and distribution, type of dwellings, and labour costs, overall costs may be lower in France due to the shared rollout model in less dense areas. This contrasts with parallel deployments by multiple operators, mostly in Portugal but also in Spain. In the UK, due to the functional separation, both the historical operator and the challengers relied on traditional wholesale offers instead of investing in VHCN.

To address high costs, regulatory and public policy interventions must be effective and proportional in incentivizing investment without harming competition.

4.5.2. Regulatory incentives for deployment

In Portugal and Spain, co-investment schemes are primarily market-driven, with the encouragement of national regulatory authorities (NRAs). NRAs sometimes use the threat of regulation to force operators to develop commercial agreements (Aimene et al., 2019). These arrangements promote the sharing of deployment costs without explicit imposition. The threat of regulation was the reason Altice in Portugal entered into a co-investment agreement with Vodafone in 2014. In Portugal and Spain, several commercial reciprocal co-investment agreements have been reached. In contrast, in France, agreements are mainly based on one-way access models, which are based on Orange's network, as shown in Figure 4.5. In the UK, until 2020, there were no relevant commercial co-investment agreements. In reciprocal access models, such as those observed in Portugal and Spain, both operators are responsible for deploying and operating their respective VHCN networks in geographically separate areas, and grant access to the other co-investors. This could potentially incentivise coverage. In one-way access models, such as those observed in France, an operator would build up the network and grant access to the other co-investor based on a long-term risk sharing agreement.

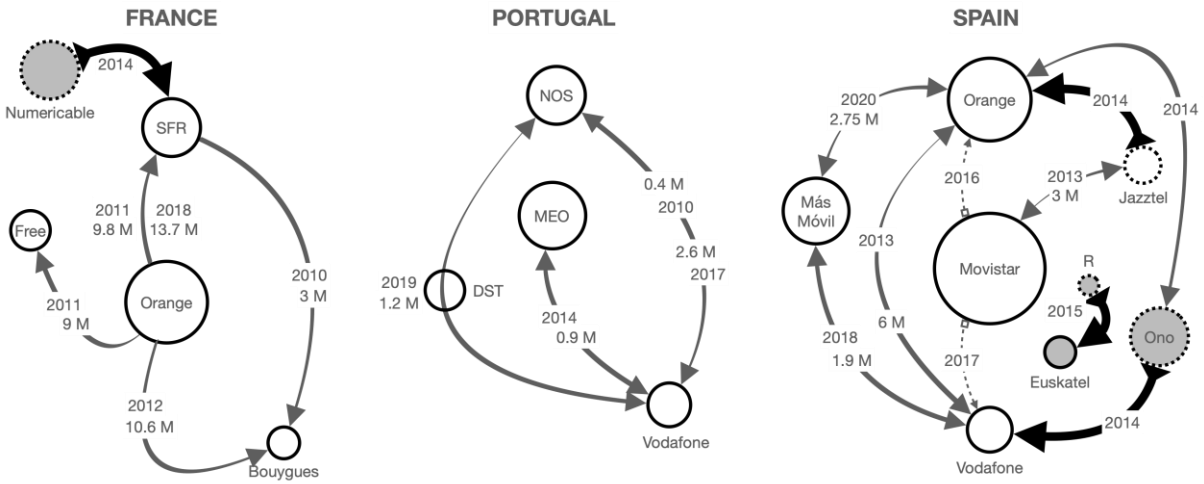


Figure 4.5. Market dynamics in France, Portugal and Spain, with major co-investments and mergers

Sources: Created by author.

Notes: The size of the circle corresponds to the number of households covered by VHCN in 2020. The grey circles represent cable operators. The thicker arrows indicate acquisitions, including the year of acquisition and the buyer (in the direction of the arrow). The thinner arrows represent co-investment agreements, with the numbers indicating the total number of shared fibres in millions. The dotted arrows represent commercial access agreements to the Telefónica/Movistar fibre network in non-regulated areas, as well as Ono's bitstream offer to Orange.

France has imposed specific forms of co-investment obligations (Aimene et al., 2019), which may increase the investment burden and discourage private investment. The regulatory approach to VHCN deployment in France, Portugal, and Spain had notable differences that influenced the investment decisions of market actors. All three countries acknowledged the significance of civil infrastructure access for VHCN deployment, but they implemented varying levels of regulatory intervention. In the UK, co-investment agreements were not present.

France imposed more demanding obligations, such as requiring coverage of the entire municipality within 5 years and mandatory access at a large mutualisation point. This extensive regulatory intervention aimed to promote access-based competition may have inadvertently created disincentives for investment, particularly in difficult or less densely populated areas. It is likely that this demanding framework has halted Orange's investment plans in France. According to Yardley et al. (2012), Orange had planned to cover 10 million households by 2015. However, as shown in Figure 4.1, the actual number of households covered was only 3.7 million. Orange, which operates as a challenger in Spain and as an incumbent in France, has covered more households with fibre in Spain, even though the country has fewer households than France. The regulatory approach in France was characterized

by statism and dirigisme (Schmidt, 1997; Jordana et al., 2006), with a significant role played by the state in shaping the VHCN market.

Portugal and Spain have adopted a more liberal regulatory approach. The focus on access to civil infrastructure and the absence of mandatory access to fibre (Spain until 2016) has given operators greater flexibility and freedom to invest according to market demand and conditions. As a result, Portugal and Spain have achieved high VHCN coverage rates compared to other countries that maintained a full ladder of obligations, notably VULA and/or physical access products. Additionally, in these countries, several investors are investing heavily in VHCN, which promotes current and potential competition.

In 2008, the market situation differed among the four countries. Portugal had two cable networks that covered approximately 66% of households, while Spain had relatively higher cable coverage (45%) compared to France (25%). The UK had also a high cable coverage with Virgin Media covering 46% of households. However, the regulatory framework in Portugal provided incentives for both the incumbent and alternative operators to invest in VHCN deployment, resulting in high coverage rates and competition[19]. The regulatory and policy approach, with access to civil infrastructures, also encouraged investments. The spin-off of the cable television business and network of the historical operator introduced competition and investment in VHCN, creating a virtuous circle of investment by all players. In contrast, France's interventionist approach may have contributed to Orange's slower-than-planned VHCN roll-out. Some operators may have been discouraged from investing in certain areas due to demanding regulatory obligations and the risks associated with co-investing with competitors. This may lead to potential imbalances in coverage. In the UK, wholesale competition based on the legacy copper network was favoured due to market dynamics and regulatory obligations. Market players only began considering mass investments in VHCN after Virgin Media initiated the upgrade to gigabit download speeds in 2018.

4.5.3. State aid

To address the challenge of high VHCN deployment costs, France has considered State aid as a possible solution. National-level State aid measures were developed and implemented by local authorities. A similar approach was adopted in the UK. In contrast, Portugal and Spain chose a more centralized approach. In Portugal, the process was entirely centralized, from the development of the measure to the design and implementation of tenders. Bidders were given the freedom to choose specific

[19] The historical operator covers almost 85% of households, NOS 81%, and Vodafone 56%. Vodafone's result is comparable to that of the largest VHCN operator in France - Orange - which still only covers 47% of households with VHCN.

locations for coverage, with local authorities mainly facilitating network deployment. Spain's State aid schemes were centrally managed, with annual tenders promoted by the central government.

A centralized model may result in better efficiency and coordination, while a decentralized model may cause tensions and delays due to coordination mismatches among different actors (Gerli and Whalley, 2020). Local activism and engagement are crucial for successful implementation of VHCN (Feasey et al., 2018, pp. 107-108), and policymakers should ensure that local actors feel engaged and connected to strategic goals. While some degree of decentralization can increase local participation, enabling the government to operate closer to the people and improve public sector performance and democratic accountability (Pina-Sánchez, 2014), excessive decentralization can lead to inefficiency and duplication of public interventions aimed at supporting rural coverage.

The French and UK approaches, involving the 'Mission très haut débit' and the BDUK respectively, to coordinate the efforts of local authorities, have the potential for long delays and inefficiencies due to the number of actors and interactions involved. Efficient deployment of VHCN requires finding the right balance between centralization and decentralization and promoting effective coordination between different institutional entities. The lagging of France and the UK regarding VHCN coverage, mainly in rural areas, may be explained by a decentralized State aid process and regulatory measures that reduce incentives to invest, aggravated with higher deployment costs in France. When considering the budget of State aid measures presented in Table 4.4, it is evident that the amount of State aid per population in rural areas in France is ten times higher than in the other three countries.

4.6. Practical implications

The study's findings provide insights for policymakers and regulators involved in State aid decisions. It highlights the importance of timely State aid interventions, efficient governance, and the impact of regulation on investment incentives. Although regulators and policymakers have different missions, it is important to recognize that regulation and State aid are not independent tools. The former promotes competition while the latter addresses market failures from the perspective of public policy. Regulations that discourage investment may require greater efforts by public authorities to provide subsidies that complement private investments. Policymakers should consider the governance models of State aid, especially when implementing centrally decided measures.

4.7. Research limitations

Research on complex phenomena, such as the impact of regulation on investment or the effectiveness of State aid procedures, through a qualitative method, may focus on specific events to the detriment

of others, which could bias the results. Furthermore, given market, regulatory and political dynamics, the conclusions cannot be extended beyond 2020 or generalised to other contexts.

4.8. Conclusion

A regulatory framework that is unique in its proportionality and balance of symmetric and asymmetric rules has incentivized (co)investment. Coupled with speedy State aid procedures, this framework has contributed to a higher level of VHCN deployment in Portugal and Spain. As of 2020, VHCN coverage in Portugal was 87% and in Spain it was over 92%. In 2020, France and the UK achieved VHCN coverage of 53% and 25%, respectively. This was due to high deployment costs, a demanding regulatory framework, and a complex and lengthy State aid process.

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CHAPTER 5

Institutional legacies and governance models: A comparative study of broadband State aid in Europe

Abstract

This article explores how historical legacies and institutional configurations impact the governance models used in implementing State aid policies for broadband in France, Portugal, Spain, and the United Kingdom. The analysis is based on historical institutionalism, focusing on path dependence, critical junctures, and gradual institutional change. A comparative historical approach shows different governance models evolving due to administrative traditions and political factors. France and the United Kingdom have evolved towards decentralized models, which capitalize on institutional flexibility and strategic reforms. Conversely, Portugal and Spain face limitations from centralized structures and institutional inertia. This study elucidates the relationship between institutional structures and policy outcomes, providing policymakers with insights for addressing digital access disparities. These findings contribute to the public administration literature, emphasizing the role of timing, sequencing, and coordination in the design of effective governance frameworks and preparing for emerging challenges (such as 5G deployment) where State aid will be needed.

Keywords: State aid; governance; digital divide; infrastructure policy; broadband; Europe; France, Portugal, Spain, United Kingdom

5.1. Introduction

In an era where digital connectivity is fundamental to economic and social inclusion, significant disparities in broadband infrastructure persist across Europe, particularly in rural and underserved regions. Tackling these disparities stands at the core of the European Union's (EU) Digital Decade strategy, which seeks to ensure universal access to high-speed connectivity (European Commission 2021). To bridge these connectivity gaps, the European Commission has encouraged the use of State aid to facilitate the development of broadband networks and has been providing funding for this purpose to Member States through various financial support instruments since 2007 (Bourreau et al. 2020). Consequently, specific State aid programs, using EU funds or national budgets, have been pursued by national governments. These State aid programs or policies have become essential tools, targeting areas where market-driven investments are insufficient, with Member State governments

investing collectively billions of euros in broadband projects (Bourreau et al. 2020). Broadband is also a fundamental component of the European Union's Recovery and Resilience Facility, designed to respond to the pandemic's effects while reinforcing territorial cohesion (Neto et al. 2023).

The design of State policies for broadband deployment is not merely a technical issue but a governance challenge. Different governance models—the structures and mechanisms through which State aid is managed and implemented, typically through centralized or decentralized models—have been adopted by each EU Member State, reflecting the historical legacies, administrative traditions, and political dynamics unique to each country. Centralized governance approaches emphasize national oversight, uniformity, and economies of scale, enabling strategic coordination at the national level. In contrast, decentralized models empower regional and local authorities to tailor policies to local contexts, fostering community engagement and potentially enhancing equity. While extensive research has explored the economic and technical dimensions of State aid policies for broadband deployment in general (e.g., Bourreau et al. 2023; Briglauer and Grajek 2023; Gerli et al. 2023), there is a dearth of knowledge regarding the institutional dynamics that led to the different governance models in different Member States (Manica et al. 2024).

This study addresses this gap by examining the emergence of the governance models of broadband State aid in four European countries. France and the United Kingdom (UK) have evolved toward decentralized implementation models, whereas Portugal and Spain have retained centralized models. By focusing on these contrasting cases, the study aims to uncover how historical legacies and institutional configurations influence the ways public authorities design and implement State aid for broadband deployment. The central research question guiding this study is: How have historical legacies and institutional configurations shaped the governance models of broadband State aid in these countries?

To answer this question, the study employs historical institutionalism (Hall and Taylor 1996) as its analytical lens. By exploring the temporal dimensions of institutional development, focusing on mechanisms such as path dependence, critical junctures, and gradual change, the research sheds light on why France and the UK have adopted more adaptive, decentralized governance frameworks, while Spain and Portugal remain constrained by centralized models. Understanding these institutional trajectories is critical not only for scholars of public policy and administration but also for policymakers, who need to grasp how existing governance structures might resist or facilitate new approaches to funding high-tech infrastructure deployment.

Although many State aid measures for broadband deployment have already been notified to the European Commission, this study remains relevant for the following main reasons. First, EU Member States still need to invest heavily in broadband to achieve the goal of universal coverage by 2030. Second, State aid is already being extended to other networks and technologies, including 5G, meaning

the design of these State aid policies—including the governance model—will remain on the political agenda in the coming years. The lessons from broadband may thus inform future policy domains like 5G. Third, the findings of this study can be used in other countries outside the European Union, where the level of broadband network development is lower.

The present study contributes to the public administration literature in three ways. First, it advances the understanding of governance models in broadband State aid by explicitly linking institutional legacies to current policy designs. Unlike prior studies that focus on economic or technical aspects, this study emphasizes the institutional dimensions, shedding light on the governance mechanisms that mediate State aid implementation. Second, it demonstrates the critical role of timing and sequencing in institutional reform, offering insights into how governance models evolve in response to changing policy demands. Third, the study provides recommendations for policymakers, addressing challenges related to multilevel coordination, regional disparities, and administrative capacity.

By combining a specific theoretical perspective with original empirical evidence, this study not only deepens the understanding of broadband governance but also offers practical lessons for designing effective governance frameworks in other policy domains. The findings have broader implications for public administration, particularly in addressing the interplay between historical legacies and contemporary policy challenges.

The article proceeds as follows. The next section outlines the theoretical foundation of the study, drawing on historical institutionalism. The methodology section then describes the research strategy and case selection. This is followed by the empirical findings (comparative case analyses of the four countries). The final sections discuss the findings in a broader context and conclude with implications for policy and theory.

5.2. Theoretical foundations of State aid governance: historical institutionalism in focus

5.2.1. Reasons for adopting the historical institutionalism framework

Governance structures influence public policy outcomes, particularly in complex and multilevel policy areas such as broadband State aid, as Gerli et al. (2023) found. These scholars noted that a shared governance model can improve aid effectiveness, but obstacles such as political factors and legal powers assigned to subnational authorities can complicate decentralization. Their work was based on current multilevel governance structures to implement State aid for broadband deployment. However, multilevel governance approaches are static, overlooking the dynamics of the temporal and historical

dimensions that shape these governance structures. Our study complements the work of Gerli et al. (2023) by examining how the current governance models of broadband State aid were shaped by historical legacies and institutional configurations.

The present study draws on the original dataset built by Manica et al. (2024), who categorized all State aid measures for broadband deployment used by EU Member States as either centralized or decentralized. Their work suggests factors that may influence the adoption of a governance model, including state structures, constitutional powers, involvement of the telecommunications sector, policy diffusion, and regional development. They argue that historical legacies and institutional configurations influence State aid governance models, emphasizing the importance of historical institutionalism in understanding these decisions.

Our study aligns with these insights by conducting a systematic analysis of the historical factors that have guided different nations in adopting their respective governance models for the implementation of broadband State aid.

Historical institutionalism offers an analytical framework for examining the impact of institutional contexts and historical legacies on policy dynamics (Schmidt 2006, 98). This framework provides a dynamic perspective on institutional structures and policy evolution through the use of key concepts, including path dependence and critical junctures. It is particularly relevant in analyzing governance models, as it integrates temporal dimensions into the study of policy and institutional change

5.2.2. The three core mechanisms of historical institutionalism

Path dependence explains how early decisions and institutional arrangements create self-reinforcing mechanisms, locking governance systems into specific trajectories (Pierson 2000a). These mechanisms include increasing returns (Arthur 1994), whereby institutions become more entrenched over time, and positive feedback loops, which amplify the costs of deviating from established practices. For instance, centralized governance frameworks often persist due to the institutional inertia created by administrative hierarchies, norms, and vested interests. Path dependence emphasizes the importance of sequence and timing in the entrenchment of particular institutional arrangements (Pierson 2000b; Rueschemeyer and Stephens 1997). The empirical analysis in this study explores how such early institutional arrangements have shaped contemporary governance frameworks for broadband State aid.

Critical junctures are periods of significant institutional change during which existing constraints are temporarily relaxed, allowing for new trajectories to emerge (Capoccia and Kelemen 2007). Decisions made during these critical junctures have the potential to set institutions on new developmental paths, often leading to enduring institutional changes that are difficult to reverse (Mahoney 2000). As Mahoney (2001, 113) points out, “not all choice points represent critical junctures;

only those choice points that close off important future outcomes should be treated as critical junctures." These moments often coincide with political, economic, or technological shifts, such as the liberalization of telecommunications markets or the introduction of EU State aid guidelines. Whereas some researchers focus on explaining the path-dependent pattern of institutional development that develops after critical junctures, others put the spotlight on what happens during critical junctures themselves (Capoccia and Kelemen 2007; Hogan 2019). To understand the processes occurring during critical junctures, one must also look at the antecedent conditions preceding the juncture (Mahoney 2001, 112-113; Slater and Simmons 2010). Critical antecedent conditions are "factors or conditions preceding a critical juncture that combine in a causal sequence with factors operating during that juncture to produce a divergent outcome" (Slater and Simmons 2010, 886). Rather than focusing heavily on the decision-making phase within the critical juncture itself, our study primarily focuses on the "reproductive" phase—that is, the path-dependent process launched after a critical juncture sets a new trajectory in motion. In doing so, we acknowledge that antecedent conditions (e.g., prior institutional strength or weakness, existing power distributions) bound what is possible during a juncture.

While critical junctures focus on abrupt shifts, gradual institutional change occurs incrementally through mechanisms such as layering (adding new rules to old ones), drift (the effect of rules changing because the environment shifts and the rules stay the same), conversion (reinterpreting or redeploying existing rules for new purposes), and displacement (removal and replacement of old rules) (Streeck and Thelen 2005).[20] These mechanisms are essential for understanding how governance models can adapt without significant disruption (i.e., in the absence of a clear critical juncture).

In our analysis, these theoretical concepts are systematically applied to the case studies to uncover the institutional mechanisms shaping governance models. We remain cognizant that in practice these mechanisms may overlap and evolve over time.[21] Table 5.1 summarizes how each concept is operationalized in our study.

[20] Streeck and Thelen (2005, p. 31) also included exhaustion as the process of gradual breakdown or decay of institutions over time.

[21] There is also some ambiguity of the boundaries of the various mechanisms (see e.g., Duit 2007). The case study builds on the 'gradual institutional change' taxonomy, while pointing to the potential benefits of using different modes of change in combination.

Table 5.1. Operationalisation of core concepts regarding institutional change

Concept	Description	Operationalisation in this study
Path dependence	Self-reinforcing mechanisms that entrench specific institutional trajectories	Tracing the historical development of governance structures to identify self-reinforcing decisions and increasing-returns processes
Critical junctures	Time-bound periods of significant change enabling new institutional trajectories	Identifying key reform moments or decisions that disrupted existing governance frameworks and opened a new path
Gradual institutional change	Incremental adjustments via layering, drift, conversion, or displacement	Examining how governance models evolved through slow-moving changes in rules or their interpretation, in the absence of abrupt breaks

Source: Authors' elaboration based on the sources cited in the text.

Mahoney and Thelen (2010a, 18-22) provide a useful framework by linking each of these modes of gradual institutional change to a typical combination of characteristics of the political context and the targeted institution. In their formulation, the political context is defined in terms of veto possibilities (strong or weak), and the characteristics of the targeted institution refer to the level of discretion in the interpretation or enforcement of that institution's rules (low or high). Table 5.2 reproduces their schema.

Table 5.2. Modes of change in relation to characteristics of political context and targeted institution

		Characteristics of targeted institution	
		Low discretion (strict interpretation/enforcement)	**Flexible interpretation/enforcement**
Characteristics of the political context	Strong veto possibilities	Layering	Drift
	Weak veto possibilities	Displacement	Conversion

Source: Adapted from Mahoney and Thelen (2010a, 19).

The relationship between radical and incremental change is central to the historical institutionalist approach. While critical junctures create windows of opportunity for abrupt institutional shifts, often triggered by exogenous shocks or major political reforms, these moments are rare and temporally bounded. In contrast, the majority of institutional evolution occurs incrementally, through mechanisms that gradually reshape existing structures (Streeck and Thelen 2005). Importantly, these two types of change are not mutually exclusive; rather, they interact dynamically. Critical junctures may initiate new trajectories, but the consolidation and further development of those paths often depend on subsequent incremental adjustments (Mahoney and Thelen 2010b, xi). Likewise, gradual change can prepare the ground for more radical breaks by weakening existing institutions or norms, thereby lowering resistance to transformative reforms (Hogan and Doyle 2007). Understanding this interplay is essential for analyzing the evolution of governance models in broadband State aid, as it allows us to identify both punctuated shifts and long-term adjustments that cumulatively reshape institutional configurations.

These theoretical foundations form the basis for the comparative analysis in subsequent sections, providing an understanding of the origins of the governance models for broadband State aid in the four countries. Our analysis focuses on both the path-dependent patterns that develop after critical junctures and the mechanisms of gradual change in periods without such junctures.

5.3. Methodology

This study employs a comparative historical methodology combined with multiple descriptive case studies to systematically analyze the phenomena under investigation (Vennesson 2008). The approach integrates historical institutionalism with process tracing, enabling the reconstruction of policy trajectories by identifying causal mechanisms and key turning points in each case.

5.3.1. The dependent variable

The concept of governance is multifaceted and has been defined in a variety of ways, with different interpretations emerging in different academic fields and contexts. One overarching definition asserts that governance is "all processes of governing" (Bevir 2013, 1). In this study, governance is defined as the power relationships between central and local authorities in public policy. In practice, it materializes in the structures and mechanisms through which State aid is managed and implemented and can be categorized into two types: centralized and decentralized models. In the context of centralized models, State aid is managed by the central state apparatus, a practice exemplified by Portugal and Spain. In contrast, decentralized models—as exemplified by the approaches in France and the UK—entrust significant authority to local or regional authorities in managing these processes (Manica et al. 2024). In essence, the dependent variable is the governance model for broadband State aid, which in each country is treated as either centralized or decentralized.

5.3.2. Rationale for country selection

The selection of France, Portugal, Spain, and the UK as case studies was driven by their diversity of institutional configurations, administrative traditions, and governance outcomes in the context of broadband State aid. Drawing on classic principles of comparative analysis (Gerring 2007; Landman 2008), these countries collectively provide a useful cross-section of European governance models, enabling an in-depth exploration of how historical, political, and institutional factors shape policy approaches to broadband State aid deployment.

Substantively, Portugal and Spain both illustrate centralized State aid governance models, while France and the UK exemplify decentralized approaches. Despite sharing certain geographical or cultural contexts (for example, Portugal and Spain together form the Iberian Peninsula), the pairs diverge markedly in critical dimensions like administrative capacity and regional autonomy. For

instance, Portugal remains a traditionally unitary, top-down system with limited regional prerogatives (Tavares and Camões 2010), whereas Spain operates a quasi-federal system wherein significant autonomy is devolved to the regions (Colino 2009). France, historically known for its dirigiste (central guiding) tradition, has incrementally adopted a hybrid model through controlled decentralization reforms since the 1980s (Cole 2006). The UK, conversely, moved towards devolution in the late 1990s, granting Scotland, Wales, and Northern Ireland substantial policy discretion (Bogdanor 1999). These varying degrees of central-local power distribution allow for a rich comparative analysis of governance outcomes.

Methodologically, this design aligns with a Most Different Systems Design (MDSD) (Anckar 2020; Przeworski and Teune 1970). The four countries differ considerably in size, state structure, and political history, yet they face a similar policy challenge (broadband gaps and the use of State aid to address them) and have, in broad terms, arrived at one of two outcomes (centralized or decentralized governance). The puzzle lies in how countries with vastly different starting conditions and institutional legacies sometimes converge on similar governance arrangements for broadband State aid (or diverge as expected). This design allows us to examine whether common mechanisms (path dependence, critical junctures, gradual changes) operate across very different contexts, and to identify unique factors that might explain why one country differs from another.

We acknowledge that these four cases do not exhaust the universe of possibilities—for example, federal countries like Germany or very small states are not included—and we do not claim full representativeness of "Europe" as a whole. Instead, our aim is analytical: by maximizing variation on many background factors and observing outcomes, we can better isolate the influence of historical institutional factors. In sum, the selected cases are justified by: (a) their contrasting administrative traditions (from historically centralized structures in Portugal and, to an extent, France, to highly devolved structures in Spain and the UK), and (b) their ability to illustrate both ends of the outcome spectrum (centralized vs decentralized models of broadband State aid). By capturing a wide range of institutional variation within a coherent substantive domain, these case studies help reveal how different historical pathways can lead to specific governance models.

Table 5.3 provides a summary of key characteristics of each case, highlighting these points of comparison.

Table 5.3. Summary of case selection and contextual variables

Country	Democratic consolidation	Subnational authority structure	RAI	Broadband State aid governance model
France	Long-established democracy	Multiple tiers (regions, départements, communes). Strong central state tradition but partial devolution since 1980s.	21.85	Decentralized
UK	Long-established democracy	Devolution implemented (Scotland, Wales, Northern Ireland have assemblies; England largely centralized).	9.59	Decentralized
Portugal	Democratic transition in 1974	Limited regional autonomy (autonomous regions for islands; no mainland regions). Municipal level with moderate powers; highly unitary state.	9.51	Centralized
Spain	Democratic transition in late 1970s	Quasi-federal with 17 Autonomous Communities. Significant autonomy in many policy areas, though some national frameworks prevail.	35.60	Centralized

Note: RAI measures the degree of political, administrative, and fiscal autonomy of subnational regions within a country. It captures both self-rule (internal authority) and shared rule (influence on national decision-making).

Abbreviation: RAI, regional authority index.

Source: Authors' elaboration based on sources cited in text (Hooghe et al. 2021).

5.3.3. Temporal scope: 1975-2012

The analysis spans from the mid-1970s to 2012. The starting point (1975) marks the transition to democracy in Portugal and Spain, which triggered debates on regional autonomy and decentralization in those countries. It is prior to the major shifts in telecommunications policy (the liberalization and privatization wave beginning in the early 1980s) and prior to the first steps towards decentralization in France and the UK. Starting in the 1970s allows us to capture the antecedent conditions leading into the broadband era. The timeframe concludes around 2012, by which time all four countries had launched national broadband plans aligned with the EU's Digital Agenda targets, providing a natural endpoint for observing the evolution of governance models. Notably, after 2012, there were no drastic governance overhauls in our cases; the models in place largely continued through the 2010s (even as new funding rounds came). Thus, our temporal window is sufficient to observe the establishment and consolidation of each governance model.

5.3.4. Data collection and analysis

The research draws upon a comprehensive desk review, including primary sources such as legislation, policy documents, and government communications, and secondary sources such as academic literature, consultancy reports, and contemporaneous analyses (e.g., audit reports, speeches). We triangulate these sources to construct each country's narrative and to cross-verify key events and interpretations. The analytical approach is to apply process tracing within each case to identify critical junctures and gradual changes, followed by a cross-case comparison to draw broader insights (Collier and Munck 2017; George and Bennett 2005).

Throughout the analysis, we use the theoretical concepts outlined to interpret events: for example, identifying a reform as a possible critical juncture, or labelling a policy adjustment as layering or conversion. This theoretically guided narrative approach allows us to remain consistent and avoid ad hoc explanations. In the next section, we present empirical evidence for each country in turn, before engaging in comparative discussion.

5.4. Governance models in action: empirical evidence from France, Portugal, Spain, and the UK

5.4.1. France: Decentralization through institutional layering

Historically characterized by strong centralization, France began to decentralize during the 1980s with the Defferre Law of 1982, which marked a critical juncture in regional policy. This landmark reform established elected regional councils and expanded decision-making powers for departmental councils and larger communes (Cole 2012). At the same time, the audiovisual and telecommunications sectors were liberalized. In 1982, Law no. 82-652 enabled local semi-public commercial cable companies—majority owned by local authorities—to operate cable networks.[22] In that same year, the French government also introduced the Plan Câble (Cable Plan), delegating network operation to these local companies (Payen 1987, 84-85). These reforms shifted power to local authorities, who were given the ability to influence the deployment of cable television and early broadband networks. Local authorities initiated the cabling process with national financing and support from the Directorate General of Telecommunications (DGT), later known as France Télécom (Thatcher 1999, 243). In essence, the Cable Plan was the instrument that transferred initial telecommunications infrastructure responsibilities to French local authorities, taking advantage of the window of opportunity opened by the decentralization policy.

The legislation enacted in 1982 also gave local governments greater powers over industrial planning, enabling them to provide financial support for regional projects (Mazey 1994, 159). The Cable Plan was devised as part of a strategy to elevate the telecommunications sector (then a state-run monopoly) as a driver of economic development (Thatcher 1999, 242). One antecedent condition that led up to the Cable Plan was France's broader economic policy at the time. The government was pursuing dirigisme décentralisé ('decentralized dirigisme'), a variant of state-directed development which entailed central coordination of industrial policy while pushing some implementation to

[22] In 1977, Decree no. 77-1098 regulated the operation of cable networks, limiting them to broadcasting television channels in areas without terrestrial coverage, with implementation assigned to Télédiffusion de France (TDF).

localities (Schmidt 1988, 53). This policy context—characterized by central planning, nationalizations, and support for large projects—set the stage for an ambitious telecom infrastructure push. The architects of the Cable Plan deliberately aligned it with the decentralization agenda by granting substantial power to local authorities in its implementation, thereby increasing its political acceptability to the Council of Ministers (it tied into a popular political reform).

In the following decades, the new institutional arrangements introduced in the early 1980s were expanded through layering, gradually altering their function and impact. The process of decentralization in the French telecom sector did not come all at once, but rather built up step-by-step. In 1996, the Postal and Electronic Communications Code was amended to permit local authorities to offer telecommunications services through the cable networks they had built. In 1999, Article L.1511-6 of the Code Général des Collectivités Territoriales (CGCT) allowed local authorities to fund public electronic communications networks where there was a public need and no private initiative—effectively giving localities a mandate to fill broadband gaps. By 2004, local authorities could deploy and operate any type of telecommunications network (no longer limited to cable).[23] Between 2004 and 2008, France notified the European Commission of multiple local broadband support projects as State aid measures; by 2008, French local authorities had invested approximately €1.4 billion in network deployment on their territories (Cour des Comptes 2017, 35). Many of these local projects were ultimately approved by the Commission as compatible aid or as not constituting aid at all (given the public purpose and open access conditions). This self-reinforcing trend of local initiative culminated in the inevitable involvement of subnational authorities in the implementation of the national broadband plan France Très Haut Débit, approved in 2010. Under that plan (updated in 2014), while the central government set strategic goals (e.g., aiming to extend optical fiber coverage to 80% of the country by 2022, requiring an estimated €13.3 billion in public investment), subnational authorities co-financed projects and participated actively in its implementation. A national task force (Mission Très Haut Débit) coordinated with local authorities to evaluate, supervise, and approve projects and grants.

France exemplifies how institutional layering enabled a decentralized governance model for broadband while still retaining central oversight. The central state provided vision, regulatory frameworks, and funding, but local governments became essential partners with their own resources and decision-making powers. Over time, what began as an overlay (layer) of local responsibility in the 1980s transformed into an expectation that local entities would be co-drivers of broadband deployment. This balance between national coherence and local adaptability has been generally maintained. Importantly, France's decentralized approach is credited with mobilizing significant additional resources and tailoring solutions to local needs—by 2020, for example, France's rural fiber

[23] Through Law no. 2004-575 which replaced article L.1511-6 CGCT with article L.1425-1.

rollout (largely overseen by local consortiums) was one of the most extensive in Europe, though it required strong central-local coordination.

5.4.2. The UK: Flexibility through institutional conversion

The UK and France have had different approaches to decentralization and local government involvement in telecommunications. In the UK, devolution of power has been a more recent (and uneven) process. Northern Ireland had a form of devolved government in the 1920s, but devolution was suspended in the early 1970s due to conflict (Bogdanor 1999). In the late 1970s, the Labour government attempted devolution for Scotland and Wales, but these efforts failed in 1979 referendums (Trench 2007, 31). This failure contributed to the downfall of the Callaghan government, and, with the election of Margaret Thatcher, devolution was shelved as an agenda (Bogdanor 1999).

During the 1980s, the UK's political-economic orientation under Thatcher's Conservative Party was strongly market-driven. This neoliberal ideology led to the privatization of British Telecom (BT) and encouragement of new cable television networks by the early 1980s (Dutton and Blumler 1988, 284). Local authorities, however, were largely excluded from this telecommunications market revolution (Graham 1995, 374). In fact, central government reforms in the 1980s often bypassed or diminished traditional local government roles, establishing new agencies and authorities for urban policy (e.g., Urban Development Corporations) that took over some local functions (Reiter et al. 2010, 175). This can be seen as an instance of displacement—where the central government replaced local government's role in certain policy domains with centrally controlled bodies.

Nearly two decades later, the political context shifted. The late 1990s brought a Labour government under Tony Blair, which was committed to a constitutional reform agenda including devolution. In 1997, referendums in Scotland and Wales (and a separate peace process referendum in Northern Ireland) were successful, providing a mandate for devolution. The backdrop of a long period of Conservative rule (1979-1997) and Labour's own historical attempts likely served as critical antecedents creating pressure for change. Devolution was also formalized through the Belfast (Good Friday) Agreement in 1998 for Northern Ireland (John et al. 2007, 117). The UK Parliament passed three Devolution Acts in 1998, transforming the UK into a quasi-federal structure (Masterman 2022).

Alongside national-level devolution, the Labour Party's domestic agenda included a "new localism" or regionalism in England. This led to the creation of Regional Development Agencies (RDAs) in England under the Regional Development Agencies Act 1998. The RDAs were intended to bridge central government objectives with regional priorities, promoting economic development, investment, and competitiveness in their regions (Pearce and Ayres 2009, 537; Ward et al. 2003, 203). The Local Government Act 2000 also granted more powers to local authorities, though these powers could still be checked by central government (Chandler 2007, 295). In summary, by the early 2000s the UK had

introduced new governance layers: devolved administrations in three of its four nations, and regional economic bodies (RDAs) within England, plus some general empowerment of municipalities.

Crucially, even though telecommunications remained formally a reserved (central) competence, these subnational entities found ways to engage in broadband initiatives under the auspices of economic development and regeneration.[24] Devolved governments (Scotland, Wales, Northern Ireland) and RDAs in England began implementing State aid measures for broadband deployment using their broad powers to foster economic development. For example, in 2003, the Northwest Development Agency (an English RDA) notified the European Commission of a broadband State aid project to serve rural areas (Chirico and Gaál 2014). It was among the first of several regional broadband schemes (others followed in Yorkshire, East of England, etc.). Here we see institutional conversion in action: existing institutions (RDAs, local councils, devolved administrations) took their general mandates (economic development, reducing regional disparities) and interpreted them to include broadband infrastructure, a task not explicitly given to them by law but also not forbidden. Essentially, they repurposed their capacity to intervene in the economy to justify investing in broadband as a means to an end (improving regional competitiveness, tackling market failures in rural connectivity).

To address regional economic disparities, the UK central government even channeled funding through RDAs for broadband. For instance, the East of England and South-West RDAs invested in broadband pilot projects in the early 2000s (Ward et al. 2001, 6). This again indicates conversion—central funds meant for regional development were used for broadband when appropriate. The involvement of local authorities varied; some municipalities also partnered in these projects, while others did not.

By 2010-2012, the UK government sought to consolidate and streamline these efforts under a national umbrella, launching the National Broadband Scheme for the UK (NBS-UK) in 2012, managed by a central unit called Broadband Delivery UK (BDUK). The NBS-UK essentially provided a common framework and funding pot for broadband State aid projects, but crucially, it still relied on local bodies (county councils, devolved governments) to lead implementation in their areas. BDUK's approach was to simplify the process and reduce the administrative burden for smaller authorities, enabling them to tailor projects to local needs while ensuring consistency with EU State aid rules. In practice, local authorities or devolved governments designed broadband rollout projects, co-funded by central grants via BDUK and often matched by their own funds or private partner investments.

[24] It is important to note that regional and local authorities in the UK can only carry out tasks assigned to them by parliamentary legislation, unlike the Continental European presumption of general competence.

The UK's approach demonstrates the potential of institutional conversion, where existing rules and structures are reinterpreted to facilitate a form of decentralized governance without a formal transfer of legal competence. Telecommunications policy remained centrally governed de jure, but de facto, subnational actors became deeply involved in implementation. This happened within the flexible constitutional setup emerging after 1998, and through the ingenuity of linking broadband to local economic mandates.

5.4.3. Spain: Decentralized autonomy within a centralized framework

The Spanish Constitution of 1978 marked the transition to democracy after General Franco's dictatorship, creating seventeen autonomous communities with significant domestic policy control (Heywood 1995, 6, 48). The Francoist authoritarian regime that preceded this transition was strongly centralizing, with few powers given to the periphery. The Constitution introduced a model often described as the Estado de las Autonomías (State of Autonomies), which defines different categories of competences: exclusive state competences, exclusive regional competences, and shared competences. It also set up mechanisms (including the Constitutional Court) to arbitrate conflicts between the central government and regions, aiming to balance state integrity with regional self-government (Heywood 1995, 147; Ruano 2017, 81).

Notably, under the Spanish Constitution, telecommunications (and more broadly, "communications") was reserved as an exclusive competence of the central state. This is a fundamental design choice: despite the broad decentralization in many areas, telecom remained under Madrid's control. However, the regions (autonomous communities) have found ways to involve themselves in the sector by leveraging other powers. For instance, regions have exclusive powers over "economic development" and shared powers in areas like scientific and technical research and, later, aspects of the "information society." These adjacent competencies provided entry points for regions to act in telecommunications indirectly. An important Constitutional Court decision in 1992 (STC 90/1992) delineated that while telecoms are state competence, regions can undertake initiatives related to the information society and infrastructure insofar as they tie into their own competencies (like education, economic development) as long as there is general coordination by the state.

In practice, in the 1990s, when national initiatives to promote the Information Society were lacking or slow, some autonomous communities started taking their own steps. For example, the regions of Murcia and Extremadura developed regional digital plans in 1996-1997 to advance information society goals (Jordana et al. 2005, 345). The central government reacted by trying to unify policies: in 1999, it set up an Interministerial Commission for the Information Society, leading to the Info XXI Action Plan (2001-2003) (Sebastián et al. 2001, 56-57). This was a national plan to coordinate efforts in ICT adoption and infrastructure. However, local authority involvement in these e-government and

infrastructure efforts remained limited. Subsequent programs (e.g., España.es launched in 2003 to boost local e-government) faced criticism for lacking sufficient consensus and regional involvement (Criado Grande 2006, 64-65).

By the mid-2000s, Spain introduced the Plan Avanza (2005), a comprehensive strategy to develop the information society. A key component of the plan was the Programa de Extensión de la Banda Ancha (PEBA), an initiative to extend broadband to underserved areas. While Plan Avanza was ostensibly collaborative, several regional governments criticized the central government for limited participation in the design of PEBA. Indeed, some regions stopped sharing their own telecom action plans with the central government after feeling sidelined (Gerli and Whalley 2020, 12). The lack of alignment between national and regional plans caused tensions: some autonomous communities went ahead with their strategies parallel to the national plans (Feijóo et al. 2014, 261-262). For instance, Catalonia and the Basque Country each developed distinctive broadband programs; Catalonia's government invested in an open-access fiber network (Xarxa Oberta) independently.

Similar center-region tensions were evident in the context of cable TV network deployment. Spain was one of the last European countries to allow competition in cable. A Constitutional Court decision in 1994 invalidated the state's monopoly over cable services, prompting legislation to liberalize cable TV (Málaga 1999, 53). Immediately after this opening, about fifty city councils, mostly controlled by the opposition Partido Popular (PP), issued tenders for local cable TV networks. The PP also threatened to challenge the constitutionality of the liberalization law if the Socialist government in power at the time tried to block those local tenders (Gil 2001, 64-65; Montes Fernández 2016, 565-566). When the PP came to national power in 1996, it launched 43 cable franchise tenders via Royal Decree 2066/1996 and Law 12/1997 (Ponce 2001, 106)[25]. Regional interests also came to play: for example, the Basque Nationalist Party (PNV), which was vital in supporting the minority PP government, advocated consolidating Basque telecom infrastructure under a regional operator, Euskaltel (Heller 2002, 677). Consequently, Euskaltel (partly owned by the Basque government) was established as the cable provider in the Basque Country. Similarly, other regions like Navarre and La Rioja set up their own regional cable operators (Gerrand 2006).

What these episodes illustrate is that even in a formally centralized policy area like telecom, the political reality of Spain's decentralization has forced a degree of de facto regionalization. Regional governments have leveraged political negotiations (as with Euskaltel) or used their powers in related domains to influence telecom outcomes. However, Spain still lacks a coherent multi-level governance framework in telecom. The central state's insistence on retaining formal control has often led to

[25] It was also this government that approved Royal Decree Law 6/1996, of June 7, on the Liberalisation of Telecommunications, which was immediately converted into Law 12/1997, of April 24.

uncoordinated efforts, duplicated infrastructure, or delayed projects when consensus is not reached. Spain's case highlights the challenges of decentralized governance when constitutional constraints and central authority limit effective coordination in a key policy area.

In summary, Spain operates within a centralized framework for telecom (as per law), but within that, regional actors have significant autonomy in tangential areas and have pushed the envelope. The outcome for broadband State aid governance is that Spain remained a centralized model (all major broadband plans like PEBA were national, and these national projects have centralized governance). Spain's struggles underscore how institutional lock-in (the constitutional allocation of telecom to the center) has stifled potentially more effective decentralized collaboration. As Wigger and Buch-Hansen (2013) note in other contexts, regulatory inertia during periods of change can prevent significant shifts—in Spain's case, even as the need for regional involvement in broadband became evident (a change in environment), the rigid institutional arrangement (legal centralization of telecom) stifled any major reconfiguration. Despite efforts by some autonomous communities to innovate or fill gaps, the central government has consistently reasserted its authority in telecommunications, minimizing regional involvement in broadband policy.

5.4.4. Portugal: Persistent centralization and institutional inertia

Portugal's transition from dictatorship to democracy in 1974 led to the adoption of a new Constitution in 1976, which introduced elements of decentralization: it created two autonomous regions (Azores and Madeira), reinforced local government (municipalities and parishes), and envisaged administrative regions on the mainland (a concept known as regionalization). However, unlike Spain, Portugal did not have directly elected regional authorities on the mainland in the aftermath of the Constitution due to political party divisions, resulting in a highly centralized state (Magone 2010; Oliveira and Breda-Vásquez 2012).

Indeed, despite an official focus on decentralization in rhetoric after 1974, what occurred was arguably the opposite: the state reinforced its presence via Regional Planning Committees (later upgraded to Regional Coordination Commissions, CCRs). These bodies were deconcentrated arms of the central government in each region (not autonomous governments), coordinating planning and implementation of national policies regionally (Nanetti et al. 2004). So rather than empowering new elected regional bodies, Portugal created a layer of central government administration in the regions. This can be seen as a form of layering that actually bolstered central control, an interesting inversion of the usual layering that adds autonomy.

In the mid-1990s, a political shift occurred: after a decade of center-right (social democrat) governments, the Socialist Party won the 1995 elections. The new government made creating eight administrative regions a priority, aiming for a more decentralized decision-making process (Magone

2000). This push led to a national referendum on regionalization in 1998. The referendum, however, resulted in a majority "No" vote. This failure effectively halted the drive for regionalization. In its wake, the government did implement some compensatory measures: cooperation among municipalities was encouraged, and the CCRs (now renamed CCDRs—Regional Coordination and Development Commissions) were somewhat strengthened to coordinate regional development in absence of elected regions (Magone 2000). However, the CCDRs remained state bodies, with limited capacity to address regional issues beyond their central mandates (OECD 2020, 7-8). Unlike the UK's RDAs, Portugal's CCDRs did not have independent authority or substantial budgets to implement regional development policies; they largely executed national operational programs for EU funds and provided technical assistance to municipalities.

The failure to establish robust subnational governance structures on the mainland reinforced the dominance of central authorities in virtually all policy areas, including infrastructure development. Administrative reform stagnated, leading to what Magone (2011) describes as persistent centralized decision-making and even neo-patrimonial tendencies in resource allocation. In terms of path dependence, Portugal's political system remained locked into a pattern where any attempt to change (like 1998's potential critical juncture) was deflected, resulting in continuity of central control.

Turning specifically to telecommunications and broadband: throughout the 1980s and 1990s, telecommunications policy and investments in Portugal were centrally managed (initially by the state monopoly, then by the state even after liberalization in late 1990s). In 1991, a law was passed allowing the establishment of cable networks by public or private companies in specific areas, but only with government authorization—again, a very top-down, permission-based system. This meant local governments could not independently launch telecom initiatives without central approval.

It was not until 2006 that an initiative specifically targeting broadband gaps emerged: the government launched a tender for "broadband community networks" projects. The idea was to provide broadband access to regions with market failures. These community network projects were somewhat analogous to pilots where inter-municipal associations or communities could get funding to build networks. To qualify for subsidies, the network infrastructure had to be owned by a public entity (like a municipality or a municipal association), though private entities could manage the operations. A central agency, UMIC (Agency for the Knowledge Society), established a technical assistance commission to oversee the projects' implementation—again, central oversight was built in.

Four projects were approved under this community networks scheme, including partnerships between intermunicipal consortia and private companies. The aim was to showcase these projects as models for nationwide broadband deployment.

By 2009, facing economic crisis and recognizing the need to boost investment, the Portuguese government designed a nationwide broadband initiative using State aid. In 2010, it notified the

European Commission of a national broadband program (with five regional lots) to extend broadband to underserved areas, funded by EU structural funds. The goal was to improve connectivity in 139 municipalities (out of a total of 308) by achieving 50% fiber coverage in each by 2013. These were sizable projects, and separate competitive tenders were organized by the central government for each region, with technical assistance from the National Regulatory Authority (ANACOM). Municipalities were allowed to participate (e.g., by forming consortia or co-investing) in the program, but tellingly, none chose to do so. In other words, even when invited into the process, local authorities largely stayed out, likely due to lack of resources or the complexity of involvement—leaving it to central agencies and winning private bidders to handle. The contracts were ultimately between the central State and the telecom operators.

This outcome underscores Portugal's institutional inertia. Despite policy innovation in using State aid for broadband, the model remained centralized in execution, and local actors were either unable or unwilling to assert themselves. The governance model in Portugal thus reflects strong lock-in: central decision-making has continued to limit multilevel coordination and local innovation. Consequently, even though infrastructure was rolled out, the approach may have missed opportunities for leveraging local knowledge or initiatives. For example, some of the networks built under the 2010 program later faced challenges with utilization and integration into local development strategies—something that might have been mitigated with more local stakeholder involvement.

In summary, Portugal's case is one of path-dependent centralization. A potential critical juncture (the 1974 democratic revolution) set the stage for decentralization, but the country's political trajectory quickly reverted to a centralized path. Another potential juncture (1998 regionalization referendum) was a missed opportunity that reinforced the existing path. In terms of gradual change mechanisms, one could say Portugal experienced drift in that the world changed (e.g., EU membership and technology needs) but its institutions (centralized governance) did not adapt sufficiently—requiring stopgap measures like community network pilots and a one-off central scheme in 2010. One could also argue layering occurred but in a paradoxical way: instead of layering decentralized elements onto a centralized system, Portugal layered more central coordinating bodies (CCRs/CCDRs) onto itself, which only served to further entrench the dominant path.

5.5. From institutional legacies to policy outcomes: unpacking governance dynamics

The comparative analysis of France, Portugal, Spain, and the UK provides an in-depth understanding of how historical institutionalism mechanisms intersect with public administration practices in broadband infrastructure deployment. The findings reveal critical insights into the institutional

mechanisms that shape public policy implementation, highlighting the dynamic relationship between governance structures, administrative traditions, and political contexts.

5.5.1. Institutional configurations and path dependency

The findings confirm the long-term impact of institutional configurations on governance outcomes, in line with the path dependency literature. The cases of Portugal and Spain illustrate the challenges associated with overcoming the inertia of established institutions. In Portugal, the centralized model reflects a post-revolutionary focus on national unity and administrative control, which has hindered attempts to decentralize decision-making. Although Portugal is less structurally constrained by formal constitutional limits on decentralization than Spain, the Portuguese case mirrors scenarios where a lack of institutional support or political will hampers regional initiatives (like the UK's difficulties in sustaining regional policy efforts post-2008). This situation reflects Skocpol's (1985) arguments about state capacity: when power is heavily centralized, the state's ability to implement effective regional development policies can be limited. Magone (2011) also highlights the enduring influence of centralized decision-making and inefficient resource allocation in Portugal, findings consistent with our observation of institutional inertia in Portuguese broadband governance. In practical terms, this inertia has impeded Portugal's ability to effectively engage local actors in broadband deployment.

Similarly, constitutional rigidity in Spain constrained the ability of regional governments to influence telecommunications policy. Despite Spain's quasi-federal structure and considerable autonomy in many policy spheres, the 1978 Constitution explicitly centralizes authority over telecommunications. This arrangement, exacerbated by strong influence from national business elites (e.g., the historically powerful Telefónica), restricted regional authority and limited the effectiveness of decentralized broadband initiatives. This is in line with Poulantzas' (1978) concept of state power and how it can reflect dominant class interests: one could argue that dominant economic elites in Spain have had an interest in maintaining a centralized telecom framework, thus hindering meaningful decentralization and policy innovation that might arise from regional experimentation. These cases (Portugal and Spain) demonstrate the tendency of institutional frameworks to become entrenched, where initial decisions (like Spain's constitutional design, or Portugal's choice not to regionalize) can limit future flexibility even under new external pressures or policy failures. In both countries, when external pressures mounted (EU digital agendas, technological change), their path-dependent governance structures impeded swift or adaptive changes in approach.

However, path dependence is not deterministic or irreversible. The experiences of France and the UK illustrate that even deeply entrenched institutions can evolve under the right conditions. In France, the dirigiste tradition (central economic planning) evolved into a more decentralized form through deliberate institutional layering over time. French local authorities became integrated into broadband

deployment strategies while the central state retained strategic oversight, effectively blending central direction with local initiative. This resonates with the framework proposed by Amable and Palombarini (2023) which emphasizes the role of diverse social groups with conflicting interests, where dominant coalitions emerge to support institutional change. In France, a coalition of interests (national policymakers, local governments, industrial stakeholders) coalesced around the idea that involving local authorities in telecom infrastructure (e.g., the Cable Plan, later rural broadband) would serve both national and local interests. The Defferre Law of 1982 created a conducive institutional environment for such coalitions by empowering local governments, and subsequent reforms (like the telecom laws of 1996 and 1999) entrenched decentralization processes within the state's institutional fabric. These reforms were implemented during periods of strong political will (early 1980s under a Socialist government committed to decentralization, and again in the late 1990s under a left government emphasizing regional equality), creating opportunities for institutional innovation that ultimately shaped long-term governance outcomes. In effect, France managed to "re-route" its path dependence: rather than continuing solely on a centralized path, it introduced new path dependencies in favor of decentralization (e.g., local governments now expect to be involved in digital infrastructure, creating a new status quo).

In the UK, while path dependence had long kept governance centralized, especially for economic policy, a combination of political change (New Labour's reforms) and accumulated pressures (the devolution debates, regional disparities) triggered a break. The UK's case shows that even a country with a unitary tradition can adopt federal-like features when political actors choose to reinterpret existing institutional arrangements (conversion of institutions like RDAs, as well as displacement via devolution). Once devolution and regional structures were in place, they created new policy pathways, allowing local input in broadband projects. Over time, this has led to enduring changes: today it is normal in the UK for, say, the Scottish Government or a county council to be a direct stakeholder in broadband initiatives—a scenario hard to imagine before the late 1990s.

In summary, France and the UK highlight that permissive conditions (windows of opportunity, shifting political ideologies) can be exploited to alter path-dependent trajectories. In contrast, Spain and Portugal underscore how reproductive sequences after a critical moment can cement a particular model, making later divergence difficult. Together, these cases underline the importance of timing, sequences, and initial institutional decisions on long-term governance models.

5.5.2. Timing, sequencing, and critical junctures

The importance of timing and sequencing in governance reform emerges as a consistent theme. Both France and the UK implemented key decentralization initiatives during broader institutional shifts, leveraging policy layering or conversion to adapt their governance models. In France, the Defferre Law

(1982) provided momentum for further policy developments like the Plan Câble shortly thereafter—the early 1980s became a sequence of reforms feeding into one another. In the UK, devolution initiatives around 1997-1999 allowed regional authorities to later engage more directly with telecommunications infrastructure, as we saw with RDAs in the early 2000s. These junctures occurred synchronously with broader political transitions (left-wing governments coming to power with decentralization mandates).

Even in the UK, where local authorities had been viewed with suspicion by previous Conservative governments, new institutional frameworks eventually supported decentralized cooperation in what were historically low-trust center-local relations (Gartzou-Katsouyanni 2024). Essentially, the combination of policy layering (adding new layers like RDAs) and flexible interpretation of existing powers from below (conversion) justified the provision of State aid for broadband by subnational entities. This interpretive flexibility, aligning with the Labour Party's ideological shift toward regionalism and localism in the late 1990s (Deas and Ward 2000; Evans et al. 2013), enabled regional authorities to leverage their powers for broadband deployment. It was the sequencing—devolution acts then regional economic policy reform then broadband projects—that made this possible.

Unlike conventional critical junctures triggered by exogenous shocks (wars, economic crises), the significant changes in France and the UK were endogenously driven, reflecting broader internal trends toward decentralization and state reform. Considering the largely endogenous nature of these transitions (no sudden external shock forced France to decentralize in 1982 or the UK in 1997; these were political choices), the pattern of change observed is consistent with what Haydu (1998) calls a process sequencing model. That is, the policy changes in our cases place greater emphasis on endogenous sources of political change—domestic political realignments, ideological evolution, learning from past attempts—rather than purely exogenous shocks that characterize the classic path-dependent model (Broschek 2010). In France, decentralization was part of a larger political project of the left in the 1980s; in the UK, devolution was a response to domestic constitutional debates maturing over decades. So, these changes, while momentous, were not random shocks but rather the culmination of building pressures and ideas.

Conversely, Portugal and Spain missed similar windows of opportunity, leading to more constrained governance structures for broadband State aid. Portugal's 1998 referendum failure represents a critical lost moment—a juncture where a decentralizing reform was on the table but was rejected. The reasons are complex (political divisions, public skepticism), but the effect was clear: it closed the door on a major shift, reinforcing the existing centralized path. In the aftermath, rather than trying incremental decentralization, Portugal doubled down on central coordination (strengthening CCRs). In Spain, the transition to democracy (1975-78) itself can be seen as a critical juncture that did produce a dramatic decentralization (creation of Autonomous Communities). However, the

constitutional framework that emerged explicitly centralized certain powers (like telecoms). The rationale for centralizing telecommunications at the time is not fully transparent—the constitutional drafting process on such details is not well-documented publicly, and it likely involved trade-offs and prevailing attitudes that national infrastructure should remain unified. But once set, this constitutional rigidity resulted in an institutional lock-in, stifling further decentralization in that sector and foreclosing collaborative multilevel governance in telecom.

As Wigger and Buch-Hansen (2013) demonstrate in another context (EU competition policy), regulatory inertia in times of crisis can prevent significant shifts; similarly, Spain's centralized constitutional provisions have shown inertia even as technology and governance norms evolved. When faced with the challenge of broadband expansion—a challenge that might have benefited from regional cooperation—Spain's rigid institutional arrangement prevented a coordinated multi-level approach. Instead, attempts by regions to assert themselves (e.g., the Basque Country's telecom initiatives, Catalonia's projects) were handled in an ad hoc, politically bargained manner, rather than through an institutionalized cooperative framework. This echoes Schmidt's (2006) concept of discursive institutionalism, which posits that the ability of actors to reshape institutions is constrained by prevailing political discourse. In Spain's case, the discourse and political consensus around the unity of the market and state control over infrastructure prevailed through the transition, embedding a narrative that central control of telecommunications was necessary. Despite some regional discourse pushing for more say (especially in regions with strong identities), that did not translate into formal change. Thus, even when autonomous communities tried to engage in telecom via their economic competencies, the central state consistently reasserted authority, minimizing regional involvement in broadband policy.

In summary, timing and sequencing mattered enormously: France and the UK acted during periods when decentralization aligned with political currents, and thus reaped long-term changes; Spain and Portugal either failed to act or were structured in a way that prevented adaptation, leaving them with centralized outcomes even when those might not have been most effective for broadband deployment.

5.5.3. Gradual change

Streeck and Thelen's (2005) conceptualization of gradual institutional change is evident in these cases, particularly in France, where incremental changes accumulated over time to lead to significant transformations in the governance model. The process in France was characterized by incremental, endogenous change after the decentralization period. Over roughly three decades, small legal changes (layering) and evolving practices led to a situation in 2010 very different from 1975 regarding local roles in infrastructure. This demonstrates how institutional empowerment can develop through the

repeated application of existing rules over time (Thelen 1999). French local governments continuously gained new competencies or funding avenues, each one perhaps modest alone, but together producing a substantial shift. It is worth noting that the precise definition of 'layering' can be somewhat ambiguous (Capano 2019; Duit 2007), but in the French case it effectively captures the cumulative nature of these adjustments. Our empirical data on France show that the new path regarding subnational authority in the telecom sector was characterized by marginal reinforcements—adding new layers of responsibility and nuance rather than any single radical change. There was no one moment where France said "local authorities are now in charge of broadband"; instead, policy by policy, their role expanded.

The UK's approach highlights the role of agency in institutional change. UK actors repurposed and reinterpreted frameworks (conversion) to enable local contributions to broadband. Additionally, the spread of ideas and best practices across English regions—a form of policy learning—played a role in how conversion took shape (Moodysson et al. 2017). The early successes or at least initiatives of some RDAs in broadband likely motivated others and showed central government that devolved approach could work. Compared to France's top-down approach, the UK saw more bottom-up influence, with local impulses (like regional advocacy for broadband to address the digital divide) shaping change.

5.5.4. Administrative traditions and adaptive capacity

Administrative traditions also influence adaptive capacity. There is a known dichotomy between hierarchical vs. networked administrative systems (Christensen and Lægreid 2007; Olsen 2006). France and the UK, despite very different traditions (Napoleonic hierarchy in France, versus the UK's mix of local self-government and recent devolution), both demonstrated the capacity to adapt their governance frameworks to meet new challenges. France's hierarchical system evolved by consciously building in networked elements (e.g., partnerships with local authorities). The UK's emphasis on regional empowerment in the 2000s reflected a broader shift towards collaborative governance, aligning with theories stressing flexibility and responsiveness (Hill and Hupe 2002). Meanwhile, Portugal and Spain's more rigid administrative setups limited adaptation. Portugal's centralized bureaucracy prioritizes stability and uniformity (Olsen 2006) often at the expense of innovation, matching how we described its governance inertia. Spain's complex but siloed system grants autonomy but without integration, illustrating that simply having multiple levels does not ensure adaptation if the coordination mechanisms are weak or if the culture favors independent action over cooperation.

These findings reinforce the importance of aligning governance reforms with underlying administrative culture. Misaligned reforms (e.g., imposing a decentralized program in a highly centralized administrative culture, as in Portugal's broadband tenders) can result in inefficiencies or conflicts. Conversely, reforms that work with the grain of administrative traditions (like France

leveraging its competent local governments which had experience in public utilities, or the UK leveraging its tradition of local government pragmatism under a new multi-level structure) are more likely to succeed and persist.

Finally, our comparative analysis suggests a need to clearly highlight the cross-case patterns. To that end, we summarize the core institutional drivers of path dependence and change for each country in a comparative format in Table 5.4 and Table 5.5.

Table 5.4. Core concepts regarding institutional change in France and the UK

Concepts	France	UK
Path dependence	Stable self-reinforcing path following the general decentralization policies from the early 1980s, marked by a critical period and subsequent layering of local authority powers.	Disruption of a previously centralized path due to late-1990s devolution and the creation of RDAs, leading to immediate involvement of subnational bodies in broadband projects.
Critical juncture(s)	1980–1984: Decentralization reforms (Defferre Law) and telecom liberalization opened space for local action (Plan Câble).	1997–2000: Devolution referendums (Scotland, Wales, Northern Ireland) and legislation created new institutions.
Mechanism of gradual change	Layering: Over decades, new competences added to local governments (e.g., 1996, 1999 laws), incrementally expanding their role in telecom without a single overhaul. This accumulation changed the governance model significantly.	Conversion: Existing institutions (RDAs, local councils) reinterpreted their economic development mandates to include broadband initiatives. Over time, bottom-up innovation became institutionalized in the model.

Source: Authors' elaboration.

Table 5.5. Core concepts regarding institutional continuity in Portugal and Spain

Concepts	Portugal	Spain
Path dependence	Strong centralizing tradition reinforced after 1974; no robust regional authorities established, leading to a persistent centralized model. Self-reinforcing mechanisms (political and administrative) lock in central control.	Highly path-dependent centralized governance due to 1978 constitutional design concentrating telecom authority at the national level. Institutional inertia maintains central control despite a federal political structure.
Critical juncture(s) (or lack thereof)	1974–1976: Transition to democracy (new Constitution) envisioned decentralization, but mainland regionalization was not implemented. 1998: Referendum on regionalization failed—a missed juncture for change, leaving the centralized model intact. (Opportunities for decentralization existed but were not realized, thus no effective critical juncture occurred to shift the trajectory.)	1975–1978: Transition to democracy created Autonomous Communities (a significant decentralization in many areas), but telecoms remained a central State competence in the 1978 Constitution. (Thus, while democratization was a critical juncture for general decentralization, it explicitly excluded telecom, preventing change in that sector. Subsequent shifts like 1990s telecom liberalization did not decentralize governance due to this constitutional lock-in.)
Mechanism of gradual change (or continuity)	Drift/Layering: Central government retained control and added only deconcentrated layers (CCRs/CCDRs) rather than empowering local/regional authorities—thus adapting superficially without changing core structures. Later broadband initiatives were managed top-down; local entities were largely passive, evidencing institutional inertia rather than adaptation.	Conversion (limited): Some Autonomous Communities attempted to use their powers (e.g., economic development) to engage in broadband and telecom (a form of conversion), but central oversight and constitutional limits curtailed their impact. Essentially, incremental adaptations occurred (regions finding loopholes to act), but the fundamental centralized framework remained unaltered.

Source: Authors' elaboration.

5.6. Conclusion

The comparative analysis of France, Portugal, Spain, and the UK highlights that broadband State aid deployment governance models are shaped by each country's historical and institutional context. Although deeply entrenched institutional rules and norms may obstruct decentralization, in France and the UK, institutional layering and the gradual empowerment of subnational authorities and conversion have resulted in more flexible and adaptive governance models, allowing regional actors to play an active role in broadband deployment. In contrast, Spain and Portugal faced challenges due to more centralized governance structures and constitutional constraints, which limited the ability of subnational authorities to engage in broadband development, creating institutional inertia.

The findings offer several practical implications for scholars and practitioners. First, the importance of aligning governance models with institutional history, as suggested by historical institutionalism, cannot be overstated. Policymakers should leverage these insights to design governance structures that build on existing capacities while introducing incremental reforms to address emerging challenges. Second, mechanisms of institutional change are not abstract—they manifest in policy decisions such as France's incremental laws empowering localities (layering) or the UK's repurposing of RDAs for broadband (conversion). Recognizing these mechanisms in action can help analysts pinpoint how change is occurring (or not occurring). For example, if a reform simply creates new bodies but leaves old power relations intact (as in Portugal's CCDRs), one might predict limited impact (drift without real change). Third, there is a tendency in comparative politics to focus on big bang moments; our analysis shows that gradual, often low-visibility changes can be equally important. Policymakers should be aware that slow, persistent reforms can succeed where abrupt change is politically impossible—and conversely, that a dramatic reform on paper (like Spain's democratization) does not automatically translate into all-sector change. Finally, while each country's story is unique, our comparative approach allows some cautious generalizations. First, historical institutionalism proves a useful lens for explaining variation in policy outcomes even in a relatively narrow domain (broadband State aid) among countries facing similar external conditions (EU digital agenda, technological change). The differences in governance models and outcomes (like extent of rural broadband coverage achieved by local vs central efforts) are not random but can be traced to institutional factors.

Future research topics may include governance models for emerging technologies like 5G (Mendonça et al. 2022), and digital technologies at large (Mendonça et al., 2024; Cardoso et al., 2025), as well as whether lessons from broadband governance can be applied to other technological sectors, for example, in the context of Important Projects of Common European Interest. Additionally, expanding the comparative analysis beyond the EU to include non-EU countries could provide insights

on how different contexts influence governance frameworks (e.g. see Freitas et al., 2024). Moreover, research into the role of political agency and actor behavior in shaping governance outcomes could deepen understanding of institutional change dynamics. Lastly, investigating rural-urban disparities in broadband deployment and how governance models can be tailored to bridge these gaps is essential for promoting inclusive growth through infrastructure investments.

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CHAPTER 6

Taking back control?

Governance failure, political leadership and the centralisation of UK broadband policy

Abstract

Between 2010 and 2023, the United Kingdom's broadband state-aid regime evolved from a decentralised delivery model led by local authorities to a centralised framework under Building Digital UK (BDUK) and Project Gigabit. Using historical institutionalism, multi-level governance, and Bayesian process tracing, this article analyses the political and institutional drivers of this shift. It tests three hypotheses: governance performance failure, political leadership and credit-seeking, and institutional opportunity. Drawing on National Audit Office and Public Accounts Committee reports, Ofcom data, Parliamentary debates, and departmental documents, the study finds that centralisation stemmed from inefficiencies and capacity limits in local delivery, combined with political incentives to accelerate progress and claim credit. Post-Brexit subsidy control autonomy and administrative reforms facilitated the change. The article shows how layering and conversion produced de facto governance displacement, raising normative questions on the trade-off between central efficiency and local autonomy.

Keywords: broadband policy; Bayesian process tracing; historical institutionalism; multi-level governance; institutional change

6.1. Introduction

Broadband connectivity has become essential infrastructure for contemporary economic and social participation, yet governments across Europe continue to grapple with extending high-speed networks nationwide (de Clercq et al., 2023). Approaches to broadband state aid vary considerably, ranging from centrally coordinated programmes to regionally empowered models, each presenting distinct advantages and challenges (Gerli et al., 2023; Manica et al., 2025). Recent scholarship has identified a trend toward recentralisation in infrastructure sectors when national authorities perceive local delivery as inadequate (Aksztejn et al., 2024), raising fundamental questions about the drivers and consequences of such governance transformations.

Between 2010 and 2023, the United Kingdom's (UK) broadband state-aid regime underwent a fundamental reconfiguration. Initially designed as a decentralised delivery model, the Superfast Broadband Programme distributed responsibility among local authorities and devolved administrations, which developed Local Broadband Plans, contributed co-financing, and managed procurement within their jurisdictions (Gerli et al., 2019; 2023). A central coordinating unit, Broadband Delivery UK (BDUK), provided guidance and a procurement framework but exercised limited operational control (DCMS, 2011). This model aligned with the Coalition Government's localism agenda (Lowndes & Pratchett, 2011) and reflected prevailing institutional traditions emphasising subsidiarity in infrastructure delivery (Manica et al., 2025).

By the early 2020s, this institutional architecture had been substantially reconfigured. Project Gigabit, the government's flagship digital infrastructure programme, adopted a centralised delivery model that concentrated decision-making authority in a single executive agency. Building Digital UK (the renamed and reorganised BDUK) assumed responsibility for designing procurement lots, awarding contracts, and managing supplier performance, while local authorities transitioned to consultative roles, providing local data, facilitating permits, and engaging communities (BDUK, 2021). This transition from decentralised to centralised governance occurred gradually over the course of a decade through layered decisions, performance reviews, and political recalibrations, presenting a puzzle for theories of institutional change within multi-level governance (MLG) systems.

This article addresses the following research question: How and why did the UK's broadband delivery model shift from decentralised to centralised governance? Understanding this transformation holds theoretical and empirical significance. First, it elaborates on the dynamics of MLG in the UK's post-devolution settlement, characterised by asymmetric central-local relations wherein devolved administrations possess distinct political mandates yet lack formal powers in telecommunications policy, having delegated implementation powers (Clark, 2024, pp. 14-15). Second, it demonstrates how incremental institutional adjustments can cumulate into qualitatively distinct governance arrangements without formal constitutional change. Third, it provides a quasi-natural experiment for evaluating Brexit's consequences in the telecommunications sector, illustrating how the removal of EU state-aid constraints enabled rapid restructuring of subsidy governance.

Existing scholarship on recentralisation in infrastructure policy has primarily examined cases driven by acute crises, such as health policy centralisation during the COVID-19 pandemic (Greer et al., 2022), or long-term structural reforms under market liberalisation (Stiel, 2022). This article adopts a mechanism-based approach integrating historical institutionalism (HI) with explicit Bayesian process tracing to explain administrative recentralisation in the absence of crisis conditions. The central argument posits that centralisation resulted from the conjunction of three factors: governance performance failure, political leadership and credit-seeking, and a permissive institutional context.

Despite the UK achieving among the highest superfast broadband (i.e. speeds ≥30 Mbps) coverage rates in the OECD (OECD, 2025, p. 26), persistent inefficiencies, weak competition, and capacity gaps in the decentralised model created functional demand for reform. Political leaders facing ambitious coverage pledges and electoral pressure provided decisive momentum for recentralisation. Simultaneously, institutional changes, including post-Brexit subsidy control autonomy, multi-year Treasury funding commitments, and BDUK's conversion into an executive agency, created favourable conditions enabling reform.

The article proceeds as follows: Section 6.2 develops the theoretical framework drawing on HI and MLG concepts and advances the hypotheses. Section 6.3 outlines the Bayesian process-tracing methodology. Section 6.4 presents empirical analysis evaluating each hypothesis against diagnostic evidence. Section 6.5 discusses implications for theories of institutional change and digital infrastructure governance, while Section 6.6 concludes with broader policy reflections.

6.2. Theoretical framework

HI emphasises that institutions shape political behaviour through path-dependent processes, with institutional arrangements undergoing continuous adjustment through mechanisms distinct from punctuated equilibrium or revolutionary transformation (Mahoney & Thelen, 2010; Streeck & Thelen, 2005). Whereas earlier institutionalist scholarship focused on critical junctures and subsequent lock-in, contemporary HI scholarship recognises that gradual, yet transformative, change occurs through endogenous processes involving institutional ambiguity, enforcement gaps, and power shifts among competing actors (Thelen, 2004). Streeck and Thelen (2005) identify five modes of gradual institutional change: displacement (replacement of old rules by new ones), layering (addition of new rules atop existing arrangements), drift (neglect or non-adaptation of rules to changing contexts), conversion (redirection of existing institutions toward new purposes), and exhaustion (withering away of institutions). Mahoney and Thelen (2010) refine this typology by linking change modes to contextual conditions, specifically, the strength of veto possibilities and the degree of discretion in rule interpretation and enforcement. These modes are not mutually exclusive and often operate sequentially or cumulatively (Graf, 2018; van der Heijden & Kuhlmann, 2016). Layering may initiate change by introducing new elements into institutional grey areas, subsequently triggering conversion of adjacent institutions, which ultimately produces drift or displacement of the original arrangements. This staged pattern of institutional change is particularly relevant for explaining the multi-year evolution from the Superfast Broadband Programme to Project Gigabit.

MLG theory complements HI by framing the case within complex territorial relations. MLG conceptualises governance as dispersed across multiple territorial levels and involving both public and

private actors in overlapping networks (Bache & Flinders, 2004; Hooghe & Marks, 2003). Hooghe and Marks distinguish between Type I MLG, characterised by nested, general-purpose jurisdictions at a limited number of stable territorial levels (national, regional, local), and Type II MLG, which involves flexible, task-specific jurisdictions intersecting across boundaries (Hooghe & Marks, 2003). The UK's broadband governance trajectory exhibits features of Type I MLG, wherein authority shifts between relatively stable territorial levels rather than proliferating into specialised agencies. Important to this analysis is the concept of territorial rescaling: the reallocation of competencies and resources between governmental levels in response to functional pressures, political contestation, or performance deficits (Bache & Flinders, 2004). Rescaling may be upward (centralisation), downward (decentralisation), or lateral (network coordination). While decentralisation dominated governance reforms across OECD countries from the 1980s onward (OECD, 2017), recent scholarship identifies countertrends toward recentralisation in specific domains, particularly infrastructure and crisis management (Greer et al., 2022; Stiel, 2022). Recentralisation typically occurs when central governments perceive subnational delivery as inadequate for achieving strategic objectives. Three conditions facilitate this process: legitimacy deficits arising from persistent performance failures; opportunity structures created by institutional or regulatory changes; and political motivation wherein central actors possess electoral or strategic incentives to reassert control (Stiel, 2022). Empirically, coordination problems, contradictory policies, or risks of joint decision traps in multi-level settings also often trigger recentralisation (OECD, 2017, p. 25). In such cases, inter-level conflicts may emerge when central mandates clash with local priorities or capacities (Sajida, 2025), and some political systems even resort to emergency powers to consolidate authority at the top (Hinterleitner et al., 2023). In UK politics, devolution remains conditional: Westminster retains ultimate legal prerogatives over telecommunications and can recover competences whenever national interests justify it (Keating, 2021, p. 53). Thus, formal powers have always remained centralised, enabling an institutional "take back control" without constitutional amendment if necessary.

Integrating HI with performance-based accounts of institutional change, we posit that sustained performance deficits undermine the legitimacy of prevailing governance arrangements and create leverage for reform advocates (Lenz & Viola, 2017). Historical institutionalist research demonstrates that inefficiencies, weak competition, and repeated implementation delays generate perceived incongruence between institutional performance and societal expectations, eroding stakeholder support and enabling reformers to overcome veto players (Capoccia & Kelemen, 2007). This legitimacy erosion operates through three mechanisms. First, functional pressure accumulates as governance failures generate costs borne by taxpayers, firms, or citizens, creating demand for corrective action. Second, epistemic contestation emerges as auditors, regulators, or policy analysts publicly challenge the effectiveness of existing arrangements, shifting the burden of proof onto defenders of the status

quo. Third, political opportunity arises when electoral cycles, leadership changes, or external shocks create windows for institutional entrepreneurs to advance alternative governance models (Mahoney & Thelen, 2010).

Synthesising these theoretical perspectives, we propose an analytical framework specifying three pathways to recentralisation:

Pathway 1: Governance performance failure. Persistent implementation deficits, coordination failures, and weak competitive outcomes undermine the legitimacy of decentralised governance, creating functional pressure for restructuring. HI theory predicts that such deficits enable institutional conversion or displacement by weakening veto players and mobilising reform coalitions.

Pathway 2: Political leadership and credit-seeking. Political actors facing ambitious policy commitments and electoral accountability possess incentives to centralise control over high-salience initiatives. MLG theory suggests that recentralisation enables central governments to claim credit for infrastructure investments while minimising blame for local failures. This reflects broader patterns of credit-claiming and blame avoidance in public policy (Weaver, 1986; Hood, 2011). Policymakers may centralise high-profile programs to maximize visible success and pre-emptively limit their exposure to blame for failure (Bach & Wegrich, 2019; Hinterleitner, 2023).

Pathway 3: Institutional and regulatory opportunity. Exogenous changes, including Brexit's termination of EU state-aid constraints, Treasury funding commitments, and agency restructuring, alter veto structures and discretionary space, facilitating rapid governance transformation. HI theory emphasises that such opportunity structures enable layering, conversion, or displacement by reducing institutional friction.

These pathways are not mutually exclusive. We hypothesise that recentralisation resulted from their conjunction: performance deficits created functional demand, political leadership provided momentum, and institutional opportunities reduced constraints. This conjunctural causation aligns with HI's emphasis on equifinality and path-dependent sequences (Mahoney & Thelen, 2010).

The framework generates testable propositions evaluated through Bayesian process tracing in Section 6.4. By systematically assessing diagnostic evidence for each pathway, we identify the mechanisms driving institutional transformation while acknowledging alternative explanations and scope conditions.

6.3. Methodology

6.3.1. Bayesian process tracing

This study employs Bayesian process tracing to evaluate competing causal explanations for the recentralisation of UK broadband governance (Beach & Pedersen, 2019; Fairfield & Charman, 2017).

Process tracing is a within-case method that allows researchers to make strong causal inferences by systematically examining evidence for hypothesised mechanisms linking causes to outcomes (Bennett & Checkel, 2015). Unlike correlation-based approaches, process tracing investigates the causal process itself, identifying how and why outcomes occur through sequential analysis of diagnostic evidence (Collier, 2011).

The UK broadband case constitutes a theory-testing application of process tracing, wherein alternative theoretical explanations are assessed against empirical evidence from a single case (Beach & Pedersen, 2019). The case offers several analytical advantages. First, it represents a clear outcome requiring explanation: the transition from decentralised (2010-20) to centralised governance (2021-23). Second, temporal boundaries are well-defined, enabling precise identification of critical junctures and sequencing. Third, rich documentary evidence permits systematic testing of rival hypotheses through multiple evidentiary tests.

Bayesian process tracing formalises causal inference by systematically updating confidence in hypotheses based on diagnostic evidence (Fairfield & Charman, 2017). The approach distinguishes between prior probability (initial confidence in a hypothesis before examining evidence) and posterior probability (updated confidence after evaluating evidence). Evidence is assessed according to its probative value, the extent to which it discriminates between competing explanations. Instead of assigning precise numerical probabilities to each clue, the analysis adopts a heuristic Bayesian process-tracing approach (Fairfield & Charman, 2022, ch. 3).

Following established process-tracing criteria (Van Evera, 1997; Collier, 2011; Bennett, 2010), we distinguish four types of evidentiary tests: straw-in-the-wind tests (weak, non-dispositive evidence), hoop tests (evidence of necessary conditions), smoking-gun tests (evidence of sufficient conditions that strongly supports one hypothesis), and in rare cases doubly-decisive tests (evidence confirming one hypothesis while eliminating others).

We operationalised these tests by specifying observable implications each hypothesis would generate if true, then assessing whether archival evidence confirms or disconfirms those predictions.

6.3.2. Data sources and collection

Evidence derives from systematic analysis of primary documentary sources spanning 2010-24, organised into four categories: government policy documents (white papers, ministerial statements, departmental strategies, procurement guidance, and BDUK programme documents), parliamentary records (Hansard transcripts from Westminster debates on broadband policy), audit and oversight reports (National Audit Office (NAO) performance audits, Public Accounts Committee (PAC) reports, and Ofcom regulatory assessments), and stakeholder submissions (industry consultation responses, local authority feedback, and devolved government position papers).

Documents were identified through structured searches of government repositories, parliamentary archives, and regulatory databases using keyword protocols (broadband, BDUK, superfast, gigabit, procurement, delivery model). Selection prioritised official decision-making records and independent evaluations over advocacy materials to ensure evidential reliability.

6.3.3. Analytical procedures

Analysis proceeded in iterative stages, integrating document analysis with process tracing logic (Dalglish et al., 2020; Cardno, 2018):

Stage 1: Chronological reconstruction. Documents were coded chronologically to establish a detailed timeline of governance developments, identifying critical decision points, policy shifts, and institutional reforms.

Stage 2: Hypothesis operationalisation. For each hypothesis, we specified distinctive evidentiary "fingerprints" that would be expected if the hypothesis were true (Beach & Pedersen, 2019). For example, if performance failure drove recentralisation, we would expect: (a) documented inefficiencies in audit reports prior to reform; (b) explicit critiques of local delivery in ministerial statements; (c) programmatic changes addressing the identified deficits.

Stage 3: Evidentiary assessment. Documents were systematically reviewed to identify evidence bearing on each observable implication. Evidence was classified by test type and assessed for probative value using structured coding matrices.

Stage 4: Triangulation and robustness checks. Findings were triangulated across source types (policy documents, audits, parliamentary debates) to verify consistency and address any contradictory evidence requiring explanation (Flick, 2018; Denzin, 2012). Temporal sequencing was confirmed to ensure purported causes preceded effects, satisfying basic causal ordering.

6.3.4. Validity and limitations

Several measures enhance internal validity. First, reliance on official records minimises recall bias inherent in interview-based methods. Second, triangulation across independent sources (NAO audits, parliamentary committees, ministerial statements) reduces risks of motivated reporting. Third, explicit hypothesis specification and structured evidentiary assessment enhance transparency and replicability (Beach & Pedersen, 2019).

Acknowledged limitations include: (1) documentary evidence may not capture informal negotiations or political bargaining occurring "behind closed doors"; (2) the single-case design limits generalisability, though the theoretical mechanisms may apply to other infrastructure sectors; (3) some clues, such as successive reports by the same agency, or multiple statements arising from one decision, are logically linked and thus assessed collectively as reinforcing evidence of a persistent

phenomenon; (4) temporal proximity limits access to classified documents, though the 2010-24 window captures the complete governance transformation.

Despite these constraints, the methodology enables robust causal inference about the mechanisms driving institutional change in the UK broadband case while maintaining analytical transparency and theoretical rigor appropriate for policy-oriented research.

Although explicit likelihood ratios are not presented, Bayesian logic is carried qualitatively. This sacrifices some numeric precision but gains clarity in the explanatory narrative.

6.4. Empirical analysis

6.4.1. Governance performance failure (H1)

The UK government's Superfast Broadband Programme, launched in 2010, exemplified a decentralised delivery model. Operational control was delegated to local bodies: DCMS (through BDUK) provided funding and frameworks, while county councils and devolved administrations managed procurement and contracts (Hutton & Clark, 2022, p. 15). The aim was to extend superfast broadband coverage (≥24 Mbps, later defined as ≥30 Mbps) to 90% of premises by 2015 and 95% by 2017 (DCMS, 2011). BDUK's guidance and a central procurement framework were intended to encourage competition for subsidised contracts while leveraging local knowledge and co-investment. Although this model aligned central funds with local initiative, serious governance failures soon emerged, providing early evidence in support of H1.

By 2013, the National Audit Office (NAO, 2013) and the House of Commons Public Accounts Committee (PAC, 2013) had reported major delays (some projects up to 22 months behind schedule) and a lack of effective competition in the procurement process. Of nine pre-qualified suppliers initially considered, only BT and Fujitsu advanced; with Fujitsu's withdrawal, BT Openreach became the sole bidder for all 26 contracts. The PAC (2013, p. 3) noted that BT was exploiting its "quasi-monopoly position" and prioritising its commercial rollout over subsidised projects. This outcome is a smoking-gun for H1: the decentralised model failed to foster supplier competition, resulting in dependence on a single provider. Such a monopolistic result is exactly what H1 would predict and is not readily explained by H2 or H3, offering near-conclusive confirmation of H1.

The NAO's follow-up report in 2015, while acknowledging improved coverage, reiterated concerns about BT's dominance, opaque costs, and the limited bargaining power of local authorities under the programme. These ongoing issues are anticipated by H1 and bolster the view that performance problems were at the forefront of policy debates. The 2015 findings function as a hoop test: persistent weaknesses needed to exist for major reform to be justifiable, and indeed they did persist (though their presence alone does not irrefutably confirm H1).

In terms of outcomes, the initial coverage targets were significantly delayed: the 90% coverage goal was only reached in 2016 and the 95% goal in 2017 (Ofcom, 2019a). By 2018, only around 10% of UK premises had full-fibre broadband, one of the lowest proportions in Europe (Ofcom, 2019b), a disappointing result given the Government's early ambition to have "the best superfast broadband network in Europe" by 2015 (BIS & DCMS, 2010, p. 3). Critics argued that the lack of timely progress toward future-proof fibre infrastructure was itself a policy failure. This point was seized upon in political debate as attention shifted to the goal of nationwide "gigabit" connectivity.

An important turning point came with the NAO's 2020 report. It concluded that DCMS had "identified that having multiple bodies undertaking procurements and allowing them to vary the standard contract templates had been causes of delay, and therefore will fund, let and manage all contracts for its Future Programme" (NAO, 2020, p. 11). This was another smoking gun for H1: it directly linked the decentralised model's performance deficiencies to the decision to recentralise. Indeed, the 2020 report explicitly recommended the very institutional model that became Project Gigabit, indicating that centralisation was seen as a necessary fix for the identified failures. Such a recommendation is difficult to explain under H2 or H3 alone, underscoring its uniquely diagnostic value for H1.

Subsequent evidence reinforced this trajectory. In 2022, the PAC (2022) questioned whether the existing approach could ever deliver gigabit connectivity to the hardest-to-reach areas under the desired timelines. Ofcom's Connected Nations 2023 report likewise highlighted persistent urban-rural disparities: by late 2023, gigabit-capable coverage exceeded 80% in urban areas but remained around 45% in rural ones. These findings function as additional hoop tests, confirming that performance shortcomings persisted and providing a continuing rationale for reform. By the late 2010s, a clear narrative had taken hold that the decentralised delivery model was underperforming, creating strong pressure for a centralised solution (consistent with H1).

6.4.2. Political leadership and credit-seeking (H2)

After most Phase 1 Superfast Broadband projects were completed by 2016-17, broadband policy entered a transitional stage. The Phase 2 "Extension Programme" marginally increased coverage, while gainshare agreements (clawback of unused subsidies due to higher-than-expected take-up) financed some further rollout (BDUK, 2025). However, from 2017 onward, two developments heightened pressure for change: (i) the widening gap between existing performance and new ambitions, and (ii) the political re-prioritisation of broadband as critical national infrastructure.

First, the terms of the performance debate shifted around 2017-18. Achieving "gigabit for all" became the new benchmark of success. Theresa May's government commissioned the Future Telecoms Infrastructure Review (FTIR) in 2018, which outlined a goal of nationwide full-fibre coverage

by 2033 and noted that this ambitious target would require both market competition and targeted government support (DCMS, 2018, p. 44). This was an official acknowledgment that fibre deployment needed to accelerate dramatically. At the same time, a growing number of alternative network providers (altnets) such as CityFibre, Hyperoptic and Gigaclear began investing in fibre networks, yet few participated in the state-aid programme, highlighting weaknesses in the existing localised procurement framework (NAO, 2020, p. 14). This untapped private-sector potential revealed the inability of the decentralised scheme to foster robust competition, an insight that relates to H3 (opportunity) as well as H1.

Second, political leadership decisively redefined the stakes. Before becoming Prime Minister in mid-2019, Boris Johnson dismissed the 2033 full-fibre goal as "laughably unambitious" and pledged "full fibre for all by 2025" (Reuters, 2019). This bold, highly visible promise became a smoking gun for H2, reframing broadband as a central electoral mission and committing the government to an exceptionally aggressive timeline. By the 2019 general election, the Conservative Party's manifesto indeed pledged nationwide "gigabit-capable" broadband by 2025 (later revised to 85% coverage by 2025) and described it as a "national mission" (Conservative Party, 2019, p. 19). During 2020-23, parliamentary debates frequently reiterated this mission (Hansard, 2020-23) and linked it to the government's flagship "levelling up" agenda and a post-Brexit vision of technological leadership (Newman, 2021). The opposition Labour Party's 2019 counterproposal to renationalise Openreach (Sutherland, 2020) underscored broadband's political salience, further motivating the incumbent government to present a market-driven but centrally orchestrated alternative. The manifesto pledge and accompanying rhetoric provide uniquely diagnostic evidence of political intent: such a high-profile commitment would be very unlikely in the absence of a credit-seeking motive, and it is not something H1 or H3 would predict. Making this public promise was also practically necessary to elevate broadband on the policy agenda: a hoop test in that without the Prime Minister's intervention, the push for centralisation might not have gained momentum. Overall, the 2019 pledge and surrounding rhetoric offer strong indication of a deliberate political impetus behind the policy shift.

Following through on this commitment, the government's National Infrastructure Strategy (published late 2020) officially embedded the 85% gigabit-by-2025 target into its plans, and the Treasury allocated an initial £1.2 billion of the promised £5 billion for rural broadband in the 2020 Spending Review (HM Treasury, 2020, p. 34). This signalled that real money was being put behind the political rhetoric.

A second key piece of evidence for H2 was the 2021-22 decision to reorganise BDUK as an executive agency (effective April 2022). The Minister for Digital Infrastructure announced this change in December 2021, explaining that it would provide BDUK with "expert and independent board oversight, appropriate operational autonomy, and delegated authority" to meet its demanding

delivery commitments (Hansard, 2021). This was a case of intentional administrative redesign aimed at concentrating accountability and strengthening delivery capacity at the centre. Notably, signs of this impending "change of approach" were visible as early as 2020: the House of Commons DCMS Committee reported in late 2020 on plans to centralise the programme (House of Commons, 2020, pp. 37-38), and NAO (2020, p. 36) had explicitly recommended moving away from fragmented local procurements by replicating local delivery functions at the centre. From an HI perspective, converting BDUK into an executive agency is a textbook example of conversion, repurposing an existing organisation to pursue new objectives (Mahoney & Thelen, 2010). Importantly, it also aligns with H2: the central government deliberately restructured its own implementation apparatus to tighten control over delivery, indicating proactive political leadership.

Throughout 2021-23, ministers consistently publicised contract awards and rollout milestones via press releases, social media, and site visits. Each individual announcement was minor, but together these recurring symbolic acts demonstrated a sustained pattern of credit-claiming behaviour. In Bayesian terms, this repeated publicity is a straw-in-the-wind for H2: suggestive of a credit-seeking motive but not definitive on its own. Nevertheless, the cumulative pattern reinforces the inference that ministers were actively shaping a success narrative, consistent with H2's logic and with documented patterns of anticipatory blame management in public policy (Vis, 2015).

6.4.3. Institutional and regulatory opportunity (H3)

H3 posits that structural and regulatory shifts created enabling conditions for centralisation. While not sufficient on their own, these changes lowered barriers and made the reform both feasible and timely.

One key enabling factor was the UK's exit from the EU. Under EU state-aid rules, broadband subsidy schemes had required notification to and approval by the European Commission, a process that often took many months (sometimes years) and demanded detailed mapping to demonstrate where market investment would fail (European Commission, 2013). Post-Brexit, the UK gained autonomy to design and implement broadband subsidy programmes without external oversight or delay. A 2021 government policy paper on subsidy control explicitly identified this new freedom as an opportunity to run faster, more flexible broadband programmes (BEIS, 2021). This regulatory shift functions as a hoop test for H3: it did not by itself drive centralisation, but without it a national procurement model like Project Gigabit would likely have been slowed or constrained by EU procedures.

A second enabler was the Treasury's £5 billion funding commitment for gigabit rollout in hard-to-reach areas, announced in 2020 (HM Treasury, 2020). Earlier programmes had relied on year-by-year funding allocations, which constrained long-term planning and made it difficult to undertake large procurements. By contrast, a multi-year, ring-fenced investment pot created financial certainty for

large-scale centralised procurements. While such funding theoretically could have been channelled through local bodies, its scale and duration made a centrally managed model far more attractive operationally. This funding commitment also serves as a hoop test for H3: it was a precondition that enabled centralisation (money was available to fund a nationwide approach), though funding alone did not dictate how the programme would be administered.

Third, market dynamics shifted significantly around the same period. As noted above, by 2021-22 Ofcom was reporting that numerous altnets were expanding fibre deployment, offering viable alternatives to Openreach in certain areas (Ofcom, 2022). The maturation of a more competitive supply market reduced the risk of monopoly outcomes under a centralised procurement framework and provided confidence that national-scale tenders could attract multiple bidders. Again, this factor did not force centralisation but made it far more practical – essentially another hoop test for H3.

Finally, the organisational transformation of BDUK into an executive agency in 2022 provided the administrative capacity and legal basis to manage hundreds of contracts centrally. Without such an institutional vehicle, implementing centralisation might have been impractical. While this change is already identified as smoking-gun evidence for H2 (demonstrating clear political intent to recentralise), in H3's logic it underscores the importance of institutional reform in creating the capacity for change. The agency conversion can be seen as a hoop test under H3: it showed that central capacity was built up (as H3 would predict), even if the existence of capacity alone does not prove that capacity-building caused the centralisation.

6.4.4. Inference and appraisal

The evidence strongly supports a conjunctural explanation in which governance failures (H1) made change necessary, political leadership and credit-seeking (H2) provided the decisive push, and institutional/regulatory opportunities (H3) enabled the change to be implemented. H1 receives substantial support, with multiple pieces of evidence of very high probative value. Indeed, the accumulated evidence provides near-conclusive confirmation that governance failures were a necessary condition for centralisation. H2 is likewise strongly supported: Johnson's 2019 pledge and the BDUK agency conversion serve as smoking guns, providing compelling evidence that political leadership was a decisive factor. Notably, despite H1-type problems existing well before 2019, no radical change occurred until a political push emerged, indicating that leadership was essential to break the inertia. H3 receives moderate support: evidence of post-Brexit autonomy, dedicated Treasury funding, a more competitive market, and administrative restructuring all indicate that crucial enabling conditions were in place when centralisation was pursued.

The interaction between H1 and H2 was decisive. Without a political intervention (H2), H1's performance problems alone might have led only to incremental adjustments; conversely, without the

grounding of genuine performance failures (H1), a politically driven centralisation would have lacked legitimacy and faced greater resistance. Their alignment made reform both necessary and feasible, while H3 ensured smooth implementation once the decision to centralise was made. In other words, H1 and H2 together drove the change, and H3 provided the permissive context that allowed their impact to translate into a new institutional model.

Chronologically, the causal sequence unfolded in a way that reflects this alignment of factors. The decentralised model's shortcomings became evident through oversight reports and data by the late 2010s (H1). Political leadership then responded to these failures: in 2019-20, top officials elevated broadband to a national priority and set ambitious targets, providing the motive and momentum for reform (H2). Crucially, this political drive coincided with structural changes that made a new approach possible: from 2020 onward, the UK benefited from post-Brexit freedom to design subsidies, a large dedicated funding pot, and the creation of a central delivery agency (H3). Thus, the causation was both conjunctural and sequential: each factor activated in turn and in combination to enable the outcome.

Despite the strong evidentiary support for H1 and H2, these inferences remain probabilistic and contingent on interpretive judgment. We checked the robustness of our conclusions by varying the order in which evidence was considered and by reflecting on alternative interpretations. Under all scenarios, H1 and H2 consistently emerged as the primary drivers (with H3 as necessary context). Different reasonable weightings could slightly weaken or strengthen individual pathways, but none undermined the overarching finding that performance failures and political leadership jointly drove recentralisation, enabled by institutional opportunities. For instance, interpreting the NAO reports as less damning would reduce (but not erase) support for H1; viewing ministers' pledges as routine rhetoric rather than genuine commitment would somewhat weaken (but not eliminate) the case for H2. Conversely, without H3's post-2019 funding and regulatory freedom, no amount of performance pressure or political will could have produced centralisation, implying H3 was indeed necessary, though by itself insufficient. Ultimately, even allowing for alternative interpretations, the conjunctural explanation holds: performance failures and political leadership were the major catalysts, enabled by the institutional opportunities of the moment (including Brexit).

6.5. Discussion

The centralisation of broadband delivery in the UK illustrates how functional, political, and institutional dynamics interacted to produce institutional change. Project Gigabit was not the outcome of a single critical event, but of accumulated pressures that together created both the necessity and the opportunity for reform. Governance failures in the decentralised model, combined with strong political incentives and enabling institutional reforms, converged to tip the system into a new equilibrium. This

case provides a lens to reconsider broader debates about institutional change, multi-level governance, and the politics of recentralisation in infrastructure policy. The interaction of these elements exemplifies a central principle of HI: major reforms often emerge from the layering and accumulation of incremental pressures rather than from sudden shocks (Mahoney & Thelen, 2010; Streeck & Thelen, 2005). In broadband policy, successive adjustments built momentum until realignment became feasible. The case thus underlines the value of conjunctural explanations in institutional analysis, where necessity, motive, and opportunity align to enable reform. In effect, multiple gradual changes and decisions coalesced into a transformative outcome..

From an HI perspective, this process confirms that gradual, endogenous change can ultimately displace an existing model. The decentralised arrangements of the early 2010s were not overturned overnight; rather, they were layered with new oversight mechanisms, incrementally converted to new purposes, and finally supplanted by an executive-agency-led system. This aligns with Mahoney & Thelen's (2010) insight that institutional resilience often yields not to abrupt rupture but to cumulative adaptations that reconfigure practices over time. Such dynamics are especially salient in unitary states like the UK, where constitutional continuity and parliamentary sovereignty reduce the likelihood of dramatic formal upheaval. Instead, relatively subtle tools (e.g. funding reallocations, agency restructuring, and regulatory reinterpretation) proved sufficient to shift governance without any change in the legal framework.

The findings also speak to MLG debates. Telecommunications is a reserved (central government) matter in the UK, but from 2010 onward the implementation of national broadband projects had been delegated to local bodies and devolved administrations. Project Gigabit shows how, within a hybrid MLG system, the centre can reassert authority without constitutional reform, using financial and administrative levers. Central government's control over funding and subsidy design, coupled with post-Brexit regulatory autonomy, enabled a recalibration of authority toward Whitehall, effectively "taking back control" within the unitary state. This reinforces the dynamic nature of MLG, with authority flowing upwards or downwards depending on circumstances (Bache & Flinders, 2004; Keating, 2021). As Jeffery and Peterson (2020) argue, MLG is not merely descriptive but reveals enduring tensions over sovereignty and effectiveness across tiers. The UK case illustrates that in the absence of entrenched protections for subnational authority, Westminster retains the capacity to claw back responsibilities whenever national priorities justify it (Bradbury et al., 2024; Morphet, 2023). In the post-Brexit context, removal of external (EU) constraints tilted the balance further toward central discretion, giving Whitehall greater latitude to reshape domestic policy implementation (Bradbury et al., 2024). The broadband recentralisation exemplifies this post-Brexit governance transformation: once EU rules no longer applied, Whitehall was able to implement a more centralised scheme relatively quickly, highlighting Brexit's role as a permissive condition for recentralisation.

The reform also underscores a paradox often noted in the UK's central-local relations: the centre accumulates power but may lack the capacity to deliver on its own ("power without capacity") (Ward et al., 2024). By centralising procurement, Whitehall reasserted control over programme direction, but successful broadband rollout still depends on collaboration with private contractors, local authorities (for permits and community outreach), and regulators. The result is a hybrid structure in which political accountability is centralised while implementation remains dispersed across multiple actors. This raises questions about effectiveness and state capacity. Centralisation may improve national-level coherence and pace, but it does not automatically resolve local capacity problems on the ground. Indeed, as Ward et al. (2024) observe, the gap between a state's despotic power (ability to make decisions) and its infrastructural power (ability to implement decisions throughout society) can widen when authority outstrips delivery capability. In the broadband rollout, the continued reliance on private suppliers and local facilitation meant that fragmentation persisted; centralisation reorganised the system but did not eliminate dependence on local and market actors.

This recentralisation move also poses a normative dilemma. It aims to improve performance and clarify accountability, but it diminishes local autonomy and democratic input. Local governments, being closer to communities, previously provided grassroots accountability and could tailor solutions to local needs; their marginalisation in the Project Gigabit model potentially weakens the responsiveness of policymaking to local contexts. In exchange for greater national uniformity and speed, the governance change risks creating a democratic deficit at the local level. This trade-off between central efficacy and local participation is a classic tension in public administration. On one hand, central intervention can streamline policy execution and ensure uniform standards. On the other hand, it may undermine the pluralism, local knowledge, and citizen engagement that decentralised governance fosters. In the UK case, policymakers deemed the performance gains worth the loss of some local control, but as implementation proceeds it will be important to monitor and mitigate the impacts on local engagement and accountability. More broadly, the case highlights the challenge of balancing democratic participation against administrative performance when considering recentralisation in any context.

The decision to centralise was undoubtedly influenced by political incentives as well. Theories of blame avoidance suggest that governments are highly sensitive to reputational risk in high-profile policy domains (Hinterleitner, 2023; Weaver, 1986). The broadband rollout, tied as it was to manifesto pledges and subject to media scrutiny, generated strong incentives for ministers to assert control. By centralising, leaders positioned themselves to claim credit for any progress while reducing the chances for local actors to dilute responsibility or potentially shift blame upward. Yet, as Rodríguez (2022) highlights, blame avoidance can be anticipatory (preventing blame by changing structures beforehand) or reactive (shifting blame after problems occur). In this case, the centralisation was largely

anticipatory, aimed at enabling a bold initiative that leaders believed would yield electoral credit if successful. However, it also increased the central government's exposure: ministers would now be directly accountable if targets were missed. This duality (credit-claiming potential versus blame vulnerability) is typical of large infrastructure programmes where political stakes are high but so are delivery risks (Hood, 2011; Bradbury et al., 2024). Interestingly, this scenario runs somewhat counter to the conventional pattern of blame avoidance, where decentralisation is used to shift blame downward (Bach & Wegrich, 2019; Heinkelmann-Wild et al., 2023). Here, recentralisation was embraced despite concentrating responsibility at the top, because the government calculated that the risk of failing to fulfil a prominent promise was greater than the risk of absorbing blame centrally. This underscores that changes to institutional design often reflect a political risk calculus: in this instance, the risk of non-delivery (and the attendant public backlash) was deemed more pressing than the risk of centralising blame.

The UK case contributes to comparative discussions of recentralisation. As Aksztejn et al. (2024) argue, recentralisation is not unique to authoritarian regimes; it also emerges in established democracies when performance deficits or crises open opportunities for central intervention. Project Gigabit exemplifies this pattern: despite a tradition of localist delivery in UK broadband, central government reclaimed authority once the decentralised model was deemed insufficient. This supports the view that decentralisation and centralisation can be cyclical, with power oscillating between levels of government as conditions change rather than moving in one irreversible direction. In other European contexts, similar shifts have occurred, often temporarily, when national coordination is needed to address urgent problems (Greer et al., 2022). In the broadband case, a crisis of performance (falling short of connectivity goals) and a critical political juncture (Brexit and a new government agenda) together produced a centralising turn. Thus, while the specifics are rooted in the UK's post-Brexit policy landscape, the broader dynamics resonate with international experiences of crisis-driven recentralisation and the recalibration of multi-level governance.

6.6. CONCLUSION

Between 2010 and 2023, the UK's approach to delivering broadband state aid underwent a fundamental shift: it evolved from a decentralised, locally administered model to a centralised programme managed by a national agency. Using a combination of historical institutionalism and Bayesian process tracing, this study has shown that the transformation is best explained by the confluence of governance failure, political leadership, and institutional opportunity.

This explanation demonstrates how gradual institutional evolution, via layering and conversion, can culminate in a de facto displacement of prior governance arrangements without any formal

constitutional change. Subnational bodies that had previously been responsible for implementation were effectively marginalised as the centre reasserted control, not through new legislation, but by reallocating funding and responsibilities. The case illuminates the dynamics of MLG in the UK's post-Brexit landscape. It shows that when armed with political will and freed from certain external constraints, the central government was able to retract previously delegated functions to achieve strategic goals. In doing so, policymakers balanced the allure of political credit against the risk of blame, ultimately determining that a visible central campaign (Project Gigabit) was worth the increased accountability it entailed. The "take back control" narrative, prominent in the Brexit debate, thus found a domestic parallel in broadband policy, suggesting that even in a highly devolved or fragmented governance system, central authorities can recentralise power if conditions align.

For policymakers, the UK's experience of centralising broadband offers a clear lesson: governance arrangements must align with policy ambitions. If local delivery mechanisms struggle to meet nationally set targets, the central government may choose to intervene and centralise. However, doing so effectively requires ensuring adequate central capacity and mitigating the loss of local insights and accountability. The findings emphasise the importance of integrating governance capacity with political commitment. While ambitious pledges (such as a nationwide gigabit rollout) can serve as powerful catalysts for reform, they must be matched by institutional adjustments (such as increased funding, streamlined rules, and appropriate organisational tools) to be achievable. As Project Gigabit continues, it will be important to monitor whether the centralised model delivers the intended improvements in efficiency and coverage, or if new challenges emerge that prompt further adaptation. Ongoing evaluation should also be attentive to the democratic impacts: whether local stakeholder engagement and responsiveness can be maintained despite the shift in decision-making upward.

For scholars of public policy and administration, this study illustrates the value of integrating multiple analytical perspectives. To explain a complex institutional change, insights were drawn from HI (on gradual change mechanisms), MLG (on central-local power dynamics), and political economy (on credit-blame calculations). In addition, the study demonstrates how Bayesian process tracing can add rigour to qualitative analysis by clearly documenting how each piece of evidence affects hypothesis credibility. The UK broadband case offers a compelling example of how and why governments may "take back control" of policy implementation in an era of complex multi-actor governance. Furthermore, it provides a methodological blueprint for disentangling such causal processes in future research on institutional change.

Finally, the case has wider implications for digital infrastructure governance. It demonstrates that programmes of this kind are arenas where technical demands, institutional legacies, and political incentives intersect. Three lessons stand out. First, institutional legacies matter: early decentralisation created the uneven capacities that later justified centralisation. Second, political leadership is decisive:

reform accelerated only when ministers tied electoral credibility to broadband targets. Third, institutional flexibility matters: governments can recalibrate governance without constitutional reform by deploying financial and administrative tools. Future initiatives such as 6G deployment, AI regulation, or smart grids may display similar oscillations between delegation and recentralisation, depending on performance outcomes and political imperatives. Infrastructure governance, therefore, remains both a technical undertaking and a political contest.

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CHAPTER 7

Strategic industrial policy in the European Union: The uneven geography of Important Projects of Common European Interest (IPCEIs) participation

Abstract

This article examines whether Important Projects of Common European Interest (IPCEIs) mitigate or intensify inequalities in state aid allocation among EU Member States. It provides the first systematic empirical assessment of IPCEI distribution across all initiatives approved until 2024. Drawing on core-periphery dynamics, differentiated integration, state capacity and strategic coupling, it argues that IPCEIs act as conditional levelling mechanisms that generate upgrading opportunities only where domestic capabilities align with project requirements. The analysis shows that absolute IPCEI funding is highly concentrated in core economies, while several peripheral and semi-peripheral countries display disproportionate commitment intensity relative to their overall state aid. Participation patterns also reveal that IPCEI engagement does not reflect a simple rift along the core-periphery divide; instead, a multitier pattern emerges, as a subset of Eastern Member States with capability limitations remains consistently excluded. The findings demonstrate that IPCEIs facilitate selective peripheral upgrading where institutional and sectoral preconditions are aligned, while simultaneously reinforcing multitier stratification with implications for the reform of EU cohesion policy.

Keywords: EU industrial policy; state aid; IPCEI; inequality; differentiated integration; state capacity

7.1. Introduction

For decades, the European Union's (EU) de facto industrial policy was shaped by ordoliberal principles that prioritized competitive neutrality and restricted selective state intervention (Bulfone, 2022). A confluence of crises, geopolitical tensions, and structural dislocations has challenged this market-centric consensus (McNamara, 2023; Terzi et al., 2023; Veugelers et al., 2024). A first rupture emerged in 2018, when the United States imposed tariffs on European steel and aluminium under national-security provisions. This episode marked an early instance of the geopoliticisation of trade and the 'weaponisation' of interdependence, exposing the EU's vulnerability to coercive economic measures (Meunier & Nicolaïdis, 2019; Schade, 2023) and intensifying debates on strategic autonomy and the need for stronger industrial capacities (Harte, 2018; Varma, 2024).

These debates gained institutional expression under the von der Leyen Commission. Early in its first mandate, it adopted the principles of 'open strategic autonomy' and 'technological sovereignty,' signalling greater willingness to deploy public resources for strategic purposes previously seen as incompatible with EU competition orthodoxy (Haroche, 2023; McNamara, 2023). The Commission's 2020 New Industrial Strategy emphasised resilience, reduced strategic dependencies and the green and digital transitions (European Commission, 2021b). Subsequent crises reinforced these priorities: the COVID-19 pandemic exposed further supply chain vulnerabilities, especially in semiconductors and medical goods (European Commission, 2021b); Russia's 2022 invasion of Ukraine destabilised energy supply; and intensifying competition with China and the United States (for example, the Inflation Reduction Act and CHIPS Act) raised concerns about European deindustrialisation (Kleimann et al., 2023). Meanwhile, the European Green Deal and the ongoing digital transformation require deep restructuring of the EU's industrial base (Hobbs, 2020).

Against this backdrop, Important Projects of Common European Interest (IPCEIs) assumed new prominence. Although created in 2014, IPCEIs became operational only with the approval of the first microelectronics project in 2018 (Meunier & Mickus, 2020; Schmitz et al., 2025; Seidl & Lopes-Valença, 2025). IPCEIs are large, cross border industrial and innovation initiatives involving a minimum of four Member States, authorised to receive exceptional State aid when they support first-of-a-kind technologies or processes that address market failures of strategic EU relevance and generate benefits that spill over beyond the participating countries (European Commission, 2014, 2021a). Between 2018 and 2024, ten major IPCEIs, covering microelectronics, batteries, hydrogen, cloud infrastructure and health technologies, mobilised more than €92.2 billion in public and private investment (European Commission, 2025).

Yet the distributive implications of IPCEIs remain contested. Supporters argue that IPCEIs generate pan European collaboration and provide peripheral economies with access to advanced technologies and networks (Di Carlo & Schmitz, 2023). Critics contend that demanding eligibility criteria and high cofinancing requirements favour fiscally and administratively strong Member States, potentially reinforcing existing asymmetries (Meunier & Mickus, 2020, p. 1088). An informal joint paper endorsed by eleven Member States in 2021 warned that IPCEIs risk creating an 'uneven playing field' (Joint non paper, 2021). Recent scholarship reinforces these concerns: Schmitz et al. (2025) show that administrative burdens and stringent conditionalities generate adverse selection and favour actors with high administrative capacity; Gräf (2024) documents how battery IPCEIs privilege technologically advanced firms and core states; and Lavery and Lopes-Valença (2025) demonstrate that semiconductor IPCEIs and CHIPS Act subsidies concentrate resources in longstanding core economies.

Despite these contributions, empirical research remains dominated by sector specific case studies and qualitative assessments. Systematic, EU wide quantitative evidence on IPCEI distribution is largely

absent. This study addresses that gap by providing a complete empirical assessment of IPCEI distribution across all 27 Member States and all approved initiatives from 2018 to 2024. The analysis moves beyond illustrative cases to map distributional patterns, quantify inequality and explain the mechanisms (core dominance, peripheral marginalisation and selective upgrading) that structure the emerging geography of European industrial policy. By highlighting both concentration trends and peripheral successes, the study informs debates on governance reforms for a more inclusive European industrial policy aligned with the EU's cohesion objectives. In doing so, it answers the research question: through which mechanisms do IPCEIs mitigate or exacerbate inequality in state aid allocation among EU Member States? Specifically, do they function as instruments of cohesion, as mechanisms reinforcing structural asymmetry or as selective upgrading opportunities for well-positioned peripheral economies?

The findings confirm aspects of the 'constrained politics' argument (Schmitz et al., 2025), showing extreme concentration of absolute resources and reinforcing concerns about administrative and fiscal barriers to entry. At the same time, the analysis identifies a subset of peripheral and semi-peripheral countries that achieve exceptionally high IPCEI intensity relative to their total state aid budgets. These cases indicate that, under certain sectoral and institutional conditions, strategic alignment and sufficient administrative capacity can allow peripheral actors to exploit upgrading opportunities embedded in IPCEIs. Explaining this pattern requires a framework that integrates core-periphery structures, differentiated integration, state capacity and strategic coupling within global production networks.

The article is organised as follows. Section 7.2 introduces four theoretical perspectives as interpretive frameworks for the observed patterns: core-periphery dynamics, state capacity constraints, strategic coupling in innovation networks and differentiated integration. Section 7.3 outlines the data and methodological approach. Section 7.4 reports the empirical results on participation and funding patterns. Section 7.5 interprets the results through the four theoretical lenses and discusses methodological limitations and avenues for future research. Section 7.6 synthesises the main findings and sets out policy implications.

7.2. Theoretical framework: competing explanations of IPCEI distribution

7.2.1. Core-periphery dynamics and structural hierarchies

A first perspective posits that entrenched core-periphery dynamics in Europe will strongly shape IPCEI participation. According to dependency-oriented political economy views, Europe's economic core (Northern and Western Europe) maintains diversified high-tech industries and control over high value-added networks, while peripheral regions (Southern and Eastern Europe) are relegated to subordinate

roles (Becker et al., 2010; Rodrik, 2016; Simonazzi et al., 2013; Weissenbacher, 2019). IPCEIs, as largescale innovation projects, might thus be dominated by core countries that can leverage greater financial resources, advanced industrial bases and agenda setting power (Bruszt & Vukov, 2024). From this structural perspective, we anticipate that core Member States will engage more extensively and secure the majority of IPCEI funding. Peripheral countries, by contrast, would participate at much lower rates, with some potentially entirely excluded or confined to marginal roles in IPCEI consortia. This suggests that IPCEIs are expected to serve as instruments of cumulative advantage for the core, reinforcing the longstanding concentration of innovation capacity and industrial prowess in Europe's core while peripheral regions remain secondary.

7.2.2. State capacity

A second perspective emphasises cross national differences in state capacity (governments' institutional ability to design and implement complex policies) as the primary determinant of IPCEI participation. Effective implementation of such initiatives requires strong competencies in public administration, technical knowledge of the targeted sectors and fiscal management, not merely formal policy adoption or political will (Besley & Persson, 2009, 2011). High-capacity states typically possess competent civil services, specialised expertise, forward-looking planning capabilities, interinstitutional coordination mechanisms and the ability to mobilise resources. In contrast, low-capacity states struggle to execute ambitious initiatives even when funding or intent exists, often due to administrative fragility or governance shortcomings (Bruszt & Campos, 2018).

In the EU, the deep integration and accession process did spur capacity building in newer Member States, particularly in horizontal, market enabling domains such as judicial independence, regulatory oversight and autonomous bureaucracies. However, these gains were uneven, often fragile and did not extend to the sector-specific or developmental capacities required to design and coordinate complex industrial policy instruments (Bruszt & Campos, 2019; Schimmelfennig & Sedelmeier, 2005, 2019; Vukov, 2025).

From this perspective, institutional capacity is a decisive factor for IPCEI participation. IPCEIs impose rigorous administrative requirements: governments must coordinate consortia of firms and research institutions internationally, navigate the EU's complex legal procedures for project approval and demonstrate that projects meet additionality criteria (that is, that the aid addresses genuine market failures). Participants are also expected to commit substantial cofinancing over multiple years (Schmitz et al., 2025). These tasks demand specialised competencies in technology assessment, finance and EU competition law (skills only some national administrations possess). In some countries, there may be no dedicated state aid unit capable of preparing and managing largescale projects. Effective IPCEI participation also requires cross ministerial coordination and transnational policy learning

networks (Domorenok et al., 2021), mechanisms often absent in the rigid bureaucracies of many peripheral governments. Comparative analyses of broadband State aid governance show that these coordination challenges translate into distinct national governance models, ranging from centralised ministerial control to arm's-length agencies and hybrid arrangements, which in turn condition how complex State aid schemes are designed and implemented (Manica et al., 2024). In this view, institutional capacity (or the lack thereof) is the primary obstacle to inclusion in IPCEIs, more so than economic size *per se*.

7.2.3. Strategic coupling in innovation networks

A third theoretical perspective, rooted in economic geography and global production networks (GPN) theory, argues that network position and strategic agency can enable certain peripheral regions to achieve exceptional outcomes (Coe et al., 2004; Yeung, 2016). The concept of strategic coupling suggests that peripheral or weaker economies can improve their prospects by aligning with the needs of powerful firms or sectors, effectively 'coupling' their region to global production networks (Yeung, 2021). Development opportunities arise when a region's capabilities or assets complement the requirements of lead companies. Such coupling allows peripheral actors to leverage their position and gain access to resources that would otherwise be beyond reach (Coe et al., 2004; Eder, 2018; MacKinnon, 2012).

Examples include regions leveraging unique natural resources, specialised skill bases or geographic proximity to core industrial clusters to attract investment and technologically upgrade, even if they remain peripheral overall (Coe et al., 2004; Yeung, 2016, 2021). Successful peripheral modernisation occurs in regions whose sectoral specialisations, natural resources or institutional/infrastructural capacities align with global network needs, enabling them to overcome geographic constraints through coupling (Fitjar & Rodríguez-Pose, 2011; Nilsen, 2019). As Yeung (2021) elaborates, there are three dynamic modes of strategic coupling: indigenous coupling (in core regions, based on local innovation), functional coupling (in emerging regions, via interfirm partnerships and extra regional linkages) and structural coupling (in peripheral regions, by providing transregional production platforms). Recent research demonstrates that peripheral regions can indeed attract and benefit from linkages with global lead firms through multilevel processes. For example, Manning and Richter (2023) find that building exchange relationships among firms, local governments and universities across scales can enable peripheral regions to 'upgrade against the odds' by embedding into global value chains.

The viability of strategic coupling via IPCEIs will depend on the match between peripheral capabilities and IPCEI project requirements. Radošević (2018) distinguishes between R&D-based innovation capacities (concentrated in core regions) and production capacities (design, engineering, management, manufacturing), which are more widely distributed across peripheral regions. As

European value chains have geographically fragmented, some peripheral economies have accumulated specialised competencies on which core firms depend. For instance, Central European countries supply intermediate goods and manufacturing tasks into German production networks (Simonazzi et al., 2013), which could enable a meaningful contribution to IPCEIs. However, such coupling often means linking peripheral production platforms with standardised activities that generate limited local spillovers and it is associated with unequal value capture favouring the lead players (Yeung, 2021; Coe et al., 2004; see also Hickel et al., 2022, on macrolevel value appropriation).

The notion of strategic coupling implies that certain peripheral or semi-peripheral countries could derive substantial benefits from IPCEIs, provided they possess specific sectoral assets aligned with the projects. By definition, IPCEIs involve cross border collaboration and integration into European value chains, allowing a well-positioned smaller economy to play a key role despite structural limitations. For example, a country with a strong presence in a particular niche, such as battery raw materials or an established automotive cluster, could assume a central role in a relevant IPCEI, disproportionate to its size (see Camuamba et al., 2025). This suggests that strategic coupling via IPCEIs benefits peripheral countries selectively rather than universally, leading to heterogeneous effects that reflect each country's specific position in European value chains.

7.2.4. Differentiated integration and multitier membership

Finally, European integration theory suggests that policies often evolve through differentiated integration, whereby not all Member States participate equally in every initiative. Differentiation can take the form of multispeed integration (some countries adopt a policy later than others) or multitier integration (some countries never participate, creating permanent inner and outer circles) (Schimmelfennig & Winzen, 2022). Multispeed differentiation is temporary and expected to converge to uniform integration over time. In contrast, multitier differentiation produces lasting divergences in integration levels among groups of states, with membership in integrated circles varying by policy area (Schimmelfennig & Winzen, 2022). Recent mapping by Schimmelfennig et al. (2022) shows that such differentiation is driven by heterogeneity in economic preferences and capacities, particularly between richer and poorer Member States and between those with strong vs. weak administrative and fiscal capacities. Scholars also link the integration of core state powers to territorial differentiation and segmented national politicisation, potentially fragmenting authority even as integration progresses (Genschel & Jachtenfuchs, 2016).

Although IPCEIs are not formally an enhanced cooperation mechanism, they resemble differentiated integration in industrial policy. Participation is voluntary and contingent on meeting certain criteria, namely, having the necessary fiscal means, administrative knowhow and involvement in relevant industrial activities (Eisl, 2022). The risk of entrenched differentiation is heightened by

feedback loops between participation and capacity development. Eisl (2022) highlights capacity and governance asymmetries surrounding IPCEIs, while Bruszt and Campos (2018) show that participating in demanding EU frameworks can build essential administrative capacities. This implies that nonparticipants miss out on the learning and coordination gains that would facilitate their future entry. The result is a self-reinforcing cycle: initial capacity deficits harden due to exclusion from the very benefits of policy participation. Consequently, a two-tier pattern may emerge: an inner circle of frequent IPCEI participants and an outer circle of states that seldom or never join. This scenario would resemble a multilevel Europe in industrial policy, potentially harming certain peripheral regions (particularly parts of Eastern Europe facing multiple structural constraints).

7.3. Data and methodology

7.3.1. Data sources and operationalisation

Our analysis covers all 27 EU Member States over the period 2018-24, corresponding to the full duration of approved IPCEIs from the inaugural microelectronics initiative (2018) through the most recent health technology project (2024). We compile three interconnected datasets to capture both absolute IPCEI allocations and relative national commitments within broader state aid portfolios.

The primary dataset documents approved state aid amounts for each country across ten IPCEI initiatives. Data are sourced directly from European Commission authorisation decisions published in the Official Journal, capturing the maximum aid intensity permitted under approved notifications rather than actual disbursements. While this approach cannot track implementation effectiveness or real expenditure patterns, it accurately reflects ex ante policy commitments and the formal allocation of strategic industrial support across Member States. For each country, we calculate total approved IPCEI funding in million euros and the number of discrete IPCEI projects in which the country participated (Table 7.1 summarises this data).

Table 7.1. Public funding authorised for IPCEIs by country and project, 2018-24 and number of IPCEI participations

Country	1st MIC (2018)	1st BAT (2019)	2nd BAT (2021)	1st H2 (2022)	2nd H2 (2022)	2nd MIC (2023)	CLD (2023)	3rd H2 (2024)	4th H2 (2024)	HLT (2024)	Total	Number of IPCEIs
AT			55	140	100	256					551	4
BE		75	45	37	206					30	393	5
BG												
CY												
CZ				30		56					86	2
											14	
DE	965	1 143	1 750	734		4 506	437	4 676	469		680	8
DK				87	41						128	2
EE				46					19		65	2
EL			45	756	26	19					846	4
ES			3	74	1 320	406	187		143	21	2 154	7
FI		36	15	150	244	48					493	5
FR	411	750	125	2 162	319	1 014	40	306	530	614	6 271	10
HR			125								125	1
HU							67			65	132	2
IE						85					85	1
IT	725	700	625	1 078	497	986	409	991	22	194	6 227	10
LT												
LU												
LV												
MT						60					60	1
NL				22	1 329	257	61	86	199		1 954	6
PL		250	25	24	511	103	36	143			1 092	7
PT				45	228			339			612	3
RO						196					196	1
SE		575	55		473						1 103	3
SI												
SK			125	36		139		365	59	84	808	6

Note: Monetary values are expressed in million euro (mEUR), except for the number of IPCEIs. Source: Authors' compilation based on European Commission IPCEI State aid authorisation decisions.

To contextualise IPCEI allocations within national economic capacity and broader subsidy patterns, we compile gross domestic product (GDP) data (2017-23, Eurostat national accounts) and total state aid expenditure (2017-23, European Commission State Aid Scoreboard) (Table 7.2). The temporal alignment with IPCEI authorisations enables direct comparison of strategic industrial policy commitments against both economic size and overall state support for industry. We calculate GDP per capita and state aid per capita for each Member State as standardised measures of economic capacity and subsidy intensity, respectively.

Table 7.2. Country level GDP and general state aid (2017-23), population and per-capita indicators

Country	Accumulated GDP 2017-23 (mEUR)	Population	General state aid 2017-23 (mEUR)	GDP per capita (€/person/year)	General state aid per capita (€/person/year)
AT	2 860 005	9 197 213	14 378	44 423	223
BE	3 515 827	11 900 123	32 508	42 206	390
BG	483 505	6 437 360	3 055	10 730	68
CY	175 659	979 865	773	25 610	113
CZ	1 712 050	10 909 500	23 724	22 419	311
DE	25 646 180	83 577 140	311 501	43 837	532
DK	2 314 096	5 992 734	32 296	55 164	770
EE	213 194	1 369 995	2 148	22 231	224
EL	1 326 984	10 409 547	7 313	18 211	100
ES	8 874 322	49 077 984	37 803	25 832	110
FI	1 719 263	5 635 971	16 402	43 579	416
FR	17 386 167	68 635 943	178 713	36 187	372
HR	414 911	3 874 350	5 542	15 299	204
HU	1 070 827	9 539 502	18 147	16 036	272
IE	2 882 876	5 439 898	9 063	75 707	238
IT	12 979 498	58 934 177	60 723	31 462	147
LT	385 833	2 890 664	4 257	19 068	210
LU	477 163	681 973	1 335	99 954	280
LV	220 899	1 856 932	2 908	16 994	224
MT	110 747	574 250	1 566	27 551	390
NL	6 119 867	18 044 027	30 117	48 452	238
PL	4 039 919	36 497 495	44 869	15 813	176
PT	1 546 833	10 749 635	8 816	20 557	117
RO	1 677 703	19 036 031	12 325	12 590	92
SE	3 509 222	10 587 710	29 699	47 349	401
SI	355 947	2 130 850	3 155	23 864	212
SK	699 495	5 419 451	3 550	18 439	94

Source: Eurostat (GDP and population, population as of 1 January 2025); European Commission, State Aid Scoreboard (general state aid, 2017-23).

Our central dependent variable, IPCEI intensity, operationalises each country's relative prioritisation of IPCEIs within its overall state aid portfolio. It is defined as the ratio of the total approved IPCEI aid for a country to its total state aid spending over an equivalent period. This metric captures the proportion of national state aid resources dedicated to IPCEIs, ranging from 0 (no participation) to 22.76 per cent (Slovakia's maximum) (see Figure 7.1). Unlike absolute funding amounts, which mechanically correlate with economic size, IPCEI intensity reveals strategic prioritisation independent of national wealth. A peripheral country devoting 10 per cent of state aid to IPCEIs demonstrates greater relative commitment than a core economy allocating 3 per cent, even if the latter's absolute expenditure is larger. This measure directly tests whether IPCEIs enable peripheral upgrading through selective resource concentration, as strategic coupling theory predicts.

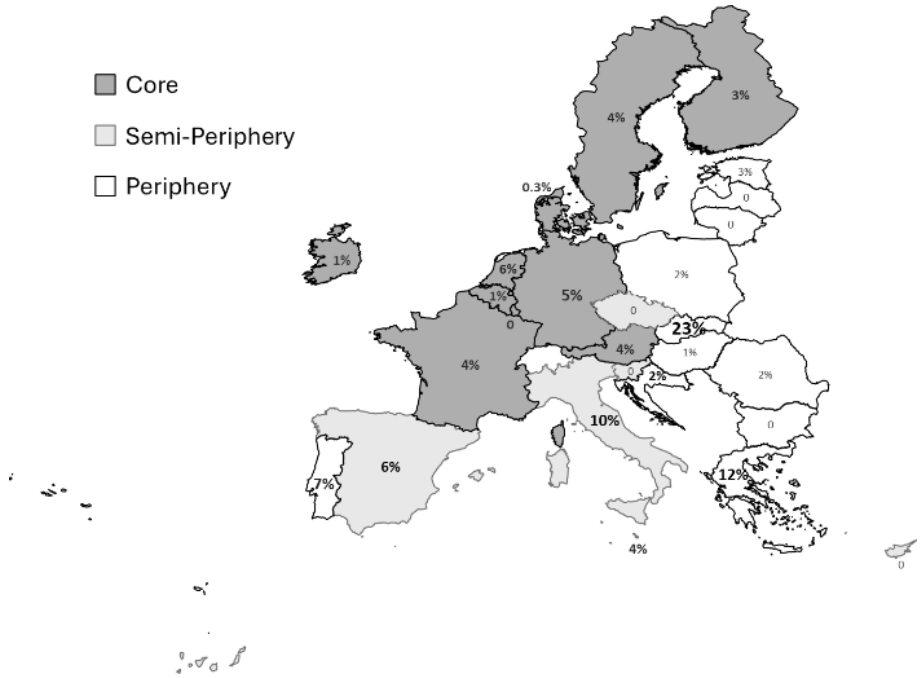


Figure 7.1. IPCEI intensity by Member State (IPCEI aid as a share of general state aid, percentage)

Source: Authors' elaboration.

We classify Member States into core, semi-peripheral and peripheral categories following Weissenbacher's (2019) structural typology of European capitalism. This classification accounts for historical trajectories of productive capacity development, technological infrastructure density, position within cross border value chains and patterns of trade specialisation. Core countries (Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, Netherlands, Sweden; n = 10) exhibit advanced manufacturing capabilities, dense innovation networks and high value-added specialisations. Semi-peripheral countries (Cyprus, Czech Republic, Italy, Malta, Slovenia, Spain; n = 6) combine medium-technology manufacturing with segments of lower value chain integration. Peripheral countries (Bulgaria, Croatia, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Romania, Slovakia; n = 11) predominantly occupy subordinate positions in European production networks, with lower technological intensity and greater dependence on cost-based competition. All the data collected is included as supplementary material.

All analyses in this study describe the population of EU-27 Member States during 2018-24. No sampling inference or generalisation to other integration contexts or periods is intended unless separately justified. Throughout, we emphasise effect size interpretation and interval estimation.

7.3.2. Theoretical expectations and hypotheses

Our analytical approach is structured around four complementary theoretical perspectives that generate distinct, though not mutually exclusive, predictions about IPCEI distribution patterns.

Core-periphery theory predicts that IPCEIs, as strategic industrial instruments requiring advanced technological capacity, substantial cofinancing and sophisticated governance capabilities, will predominantly benefit core economies. The structural advantages of core regions (superior fiscal resources, established innovation ecosystems, historical governance influence over EU institutions and proven track records in complex European programs) position them to dominate both absolute funding and governance control. We therefore expect (H1) extreme concentration of total IPCEI funding in core Member States, exceeding their share of EU GDP, with peripheral countries accessing disproportionately small allocations. Moreover, we anticipate that core countries will coordinate the majority of IPCEI initiatives, institutionalising their gatekeeping role. If confirmed, this finding suggests IPCEIs function as accumulative rather than redistributive instruments, reinforcing rather than mitigating territorial asymmetries.

State capacity theory emphasises that IPCEI participation imposes stringent administrative demands beyond formal eligibility criteria: analytical capacity to develop technically sophisticated project proposals, specialised legal expertise in state aid law, fiscal coordination to assemble multiyear cofinancing commitments and interministerial coordination to align industrial, innovation and regional policies. These 'hidden' requirements de facto exclude countries lacking developed multidimensional state capacities, even if they possess relevant industrial assets. We expect (H2a) significant variation in IPCEI participation within peripheral countries, with only those possessing above-threshold administrative effectiveness successfully navigating approval processes. Countries such as Estonia (digital governance leader) should participate despite peripheral status, while Latvia and Lithuania (lower governance quality scores) face exclusion despite comparable EU accession timelines and economic structures. Conversely, we expect (H2b) that even wealthy countries lacking relevant sectoral specialisations or institutional fit (for example, Luxembourg's finance-oriented economy) will exhibit minimal IPCEI engagement. This hypothesis tests whether participation depends on context specific alignment of capabilities rather than aggregate economic capacity alone.

Strategic coupling theory from economic geography argues that peripheral regions can achieve exceptional outcomes by aligning local assets with the strategic needs of powerful transnational actors, positioning themselves as indispensable nodes within value networks despite structural disadvantages. Applied to IPCEIs, this perspective predicts that peripheral countries possessing sectoral specialisations matching IPCEI priorities (for example, Slovakia's automotive base for battery technology, Greece's renewable endowments for hydrogen, Portugal's wind capacity for energy transition) can leverage strategic alignment to secure disproportionate funding relative to overall state aid budgets. We expect (H3) that successful peripheral participants will exhibit substantially higher IPCEI intensity than their core counterparts, concentrating limited state aid resources on strategic coupling opportunities. This would manifest as heterogeneity within the periphery: some countries

achieving notable intensity (selective upgrading), others remaining excluded (marginalisation). Furthermore, strategic coupling theory predicts that intensity, not absolute funding, drives peripheral success, a pattern invisible in analyses focused solely on allocation totals.

Differentiated integration theory examines how variable participation across policy domains can harden into permanent multitier membership structures through self-reinforcing feedback mechanisms. Initial participation generates policy expertise, network relationships, institutional track records and credibility with Commission evaluators, advantages that reduce barriers to subsequent engagement. Conversely, initial exclusion deprives countries of learning opportunities, network access and demonstration effects, raising entry costs for future projects. We therefore expect (H4) emerging multitier patterns in IPCEI participation: an 'inner circle' of repeat participants accumulating advantages (predominantly core countries plus select high-capacity peripheral states) and an 'outer circle' of systematically excluded countries (primarily small peripheral Eastern European states) unable to overcome administrative and fiscal barriers. Temporal analysis should reveal (H4a) that participation rates accelerate for early adopters while persistently excluded countries fall further behind over successive IPCEI waves and (H4b) that geographic concentration in early IPCEIs solidifies rather than diffuses over time. If confirmed, this finding document differentiated integration dynamics in European industrial policy, with concerning implications for cohesion and political legitimacy.

7.3.3. Analytical strategy

Descriptive analysis and inequality measurement

We begin by mapping the distribution of IPCEI funding across Member States, comparing absolute allocations, per capita funding and intensity ratios across categories. To quantify concentration and test H1, we calculate two standard inequality metrics:

Gini coefficient: The Gini coefficient (G) measures inequality on a 0-1 scale (0 = perfect equality; 1 = maximum inequality). We compare the Gini for IPCEI funding distribution to the Gini for GDP distribution to see if IPCEIs concentrate resources more than economic size would predict. If the IPCEI Gini exceeds the GDP Gini, then IPCEIs exacerbate (rather than mitigate) territorial inequality, supporting the core-periphery hypothesis.

Herfindahl-Hirschman Index (HHI): The HHI is the sum of the squares of each country's share of total IPCEI funding, ranging from 0 (perfect equality) to 10000 (complete monopoly). Following standard benchmarks (see European Commission, 2004), we interpret an HHI above 1000 as indicating a moderately concentrated distribution and above 2000 as highly concentrated. This complements the Gini by emphasising the dominance of top recipients.

Nonparametric statistical tests

Given our full sample data (N=27) and nonnormal IPCEI intensity distribution (Kolmogorov-Smirnov p = 0.01), we use nonparametric methods to compare groups without parametric assumptions. These methods allow us to describe medians and distributional differences; however, we interpret statistical significance in terms of effect size rather than strict inference beyond this sample.

To test whether IPCEI intensity differs across core, semi-periphery and periphery (H2a, H3), we conduct a Kruskal-Wallis rank-sum test. This assesses whether median intensity ranks differ across categories without assuming normality or equal variances. The null hypothesis is that the distributions are identical; a significant result indicates systematic stratification. We follow up with pairwise Mann-Whitney U tests to identify specific group differences.

We also calculate Spearman's rank correlation (ρ) to examine monotonic relationships between IPCEI outcomes (total funding, intensity) and economic variables (GDP, GDP per capita, state aid per capita). Unlike Pearson's r, Spearman's ρ is robust to outliers and captures nonlinear monotonic associations. This tests whether absolute IPCEI funding correlates with economic size (as core-periphery theory predicts) while IPCEI intensity is uncorrelated with GDP per capita (supporting strategic coupling rather than wealth-driven participation).

Quantile regression analysis

We next examine whether the determinants of IPCEI intensity vary across the participation distribution, as posited by H3 for high performing peripheral countries. We estimate quantile regression models at $\tau = 0.25, 0.50, 0.75, 0.90$ (Koenker & Bassett, 1978), corresponding to low, median, high and top participation levels. Unlike OLS, which focuses on the mean, quantile regression models the conditional outcome at different points in the distribution.

Our specification includes GDP per capita (standardised), state aid per capita (standardised) and dummy variables for semi-peripheral and peripheral status (core is the reference). This approach can detect threshold effects and heterogeneous relationships that mean-based OLS could mask. For example, if the coefficient on GDP per capita is positive at upper quantiles but negligible at lower quantiles, it implies that wealth facilitates IPCEI intensity only for countries already in the top participation group (a Matthew effect). Similarly, if the peripheral status coefficient is negative at $\tau = 0.25$ but positive at $\tau = 0.90$, it confirms that high intensity peripheral participants pursue an 'all-in' strategy distinct from core patterns (as H3 suggests).

Hierarchical cluster analysis

Finally, to identify natural groupings of countries based on participation patterns, we perform hierarchical clustering (Ward's method) using four standardised variables: IPCEI intensity, GDP per capita, state aid per capita and number of IPCEI projects. All variables are z-scored to equalise weighting. Ward's method merges clusters by minimising the increase in within-cluster variance at

each step, producing compact, well separated clusters. We use the elbow method and theoretical interpretability to decide on the number of clusters.

This analysis tests whether participation patterns cut across or mirror the core-periphery categories. For instance, if Greece, Portugal and Poland cluster with France and the Netherlands based on high IPCEI intensity (despite lower wealth), it would indicate strategic coupling and state capacity mechanisms overriding structural position. Conversely, if clusters align exactly with geography, it would support a deterministic core-periphery interpretation.

7.4. Results

7.4.1. Distribution of IPCEI funding and participation

A descriptive mapping reveals marked skewed allocation of IPCEI resources across Member States.

Germany and France alone account for €14.68 billion and €6.27 billion respectively, securing over 55 per cent of all approved IPCEI state aid, far above their combined 42 per cent share of EU GDP. Including Italy, the three largest contributors control over 70 per cent of all allocated resources, compared to their combined 55 per cent share of EU GDP. In contrast, several countries (primarily in Eastern and Southern Europe), allocated negligible shares or none at all (Bulgaria, Cyprus, Lithuania, Latvia, Luxembourg and Slovenia report zero participation). In terms of power and influence, it is worth noting that Germany and France coordinated nine of the ten IPCEIs, while the remaining IPCEI was coordinated by the Netherlands.

Relative commitment, measured by IPCEI intensity, despite also skewed, diverges significantly from absolute funding patterns. While core economies dominate in total funding, several peripheral and semi-peripheral countries exhibit the highest intensity values: Slovakia (22.8 per cent), Greece (11.6 per cent), Italy (10.3 per cent), Portugal (6.9 per cent) and Spain (5.7 per cent). Notably, this intensity is not a simple function of economic size, since some less affluent states devoted a much larger portion of their state aid to IPCEIs than wealthier states.

7.4.2. Inequality and concentration metrics

Formal measures confirm the intuition of extreme concentration. The Gini coefficient for the distribution of approved IPCEI funding among Member States is 0.78, substantially higher than the Gini for GDP (0.66), indicating a much more uneven allocation than economic size alone would predict. The Herfindahl-Hirschman Index (HHI) for IPCEI funding is 2119, signifying a highly concentrated distribution. A small set of countries thus holds a disproportionate share of resources and, by extension, influence in shaping these projects.

7.4.3. Group differences: core, semi-periphery, periphery

Nonparametric tests offer a more detailed picture of group dynamics. The Kruskal-Wallis H-statistic ($H = 0.12$, $p = 0.942$) finds no statistically significant differences in median IPCEI intensity across the core, semi-periphery and periphery groups, suggesting that broad geographic category by itself is not the primary driver of relative participation. Pairwise Mann-Whitney comparisons likewise reveal no significant differences between any two groups ($p > 0.78$). However, descriptive patterns show that while the peripheral category contains both the lowest and highest intensity values, most peripheral countries cluster at the very low end or have no participation, whereas a small subset (notably Slovakia, Greece, Portugal, Poland) stand out with exceptionally high intensities, suggesting a bimodal structure rather than a smooth gradient.

7.4.4. Correlational structure: economic size, wealth and intensity

Spearman rank correlations confirm the role of economic size in absolute funding but not in intensity. Total IPCEI funding is strongly associated with national GDP ($\rho = 0.85$, $p < 0.001$) as well as with total state aid spending ($\rho = 0.82$, $p < 0.001$), meaning the largest economies secured the greatest funding. By contrast, IPCEI intensity shows essentially no correlation with GDP per capita ($\rho = 0.12$, $p = 0.55$), reinforcing that a country's relative prioritisation of IPCEIs is not explained by its economic prosperity.

7.4.5. Quantile regression: heterogeneous effects across the distribution

Quantile regression results reveal heterogeneity consistent with selective peripheral success. Across the participation distribution, GDP per capita and state aid per capita have coefficients near zero (with confidence intervals spanning zero), indicating little association with intensity for most countries. However, at the 90th percentile (the top performers), the model explains more variance (Pseudo-$R^2 \approx 0.24$) and the dummy coefficients for peripheral and semi-peripheral status turn positive (though not always significant). In this top tier, peripheral countries achieve higher relative intensity than core states. Notably, Slovakia, combining one of the lowest GDP per capita and state aid per capita with the highest IPCEI intensity, demonstrates that strategic sectoral alignment and focused commitment, rather than wealth, are critical determinants of exceptional outcomes. This provides quantitative support for the strategic coupling hypothesis.

7.4.6. Ward«s method: Clustering IPCEI participation across EU countries

Agglomerative cluster analysis (Ward's method on the four variables - IPCEI intensity, GDP per capita, State aid per capita and number of IPCEI projects) identifies four distinct clusters:

1. Wealthy nonparticipants (IE, LU): Extremely high GDP per capita but minimal or no IPCEI engagement.

2. Core participants (AT, BE, DE, DK, FI, FR, NL, SE): Core countries with high capacity and consistent (though not extreme) IPCEI involvement.
3. Low/nonparticipants (BG, CY, CZ, EE, HR, HU, LT, LV, MT, RO, SI): Mostly peripheral or semi-peripheral with marginal or no participation and below average resources.
4. High intensity mixed (EL, ES, IT, PL, PT, SK): A mix of core and peripheral countries distinguished by high IPCEI intensity and participation in multiple projects, despite having only average or below average wealth and capacity.

These clusters show that IPCEI participation patterns cannot be reduced to a simple core-periphery divide. Instead, a clear bimodal pattern emerges among peripheral countries, with some exhibiting 'all-in' commitment (Cluster 4) while many remain excluded (Cluster 3). Likewise, core countries are not monolithic: most cluster together as diversified, consistent participants (Cluster 2), but the wealthiest exhibit little interest in IPCEIs (Cluster 1). Figure 7.2 presents the Ward's-method hierarchical clustering dendrogram for the 27 Member States, based on standardised IPCEI intensity, GDP per capita, state aid per capita and IPCEI project counts and visually identifies the four-cluster structure (wealthy nonparticipants, core participants, low/nonparticipants and high-intensity mixed participants).

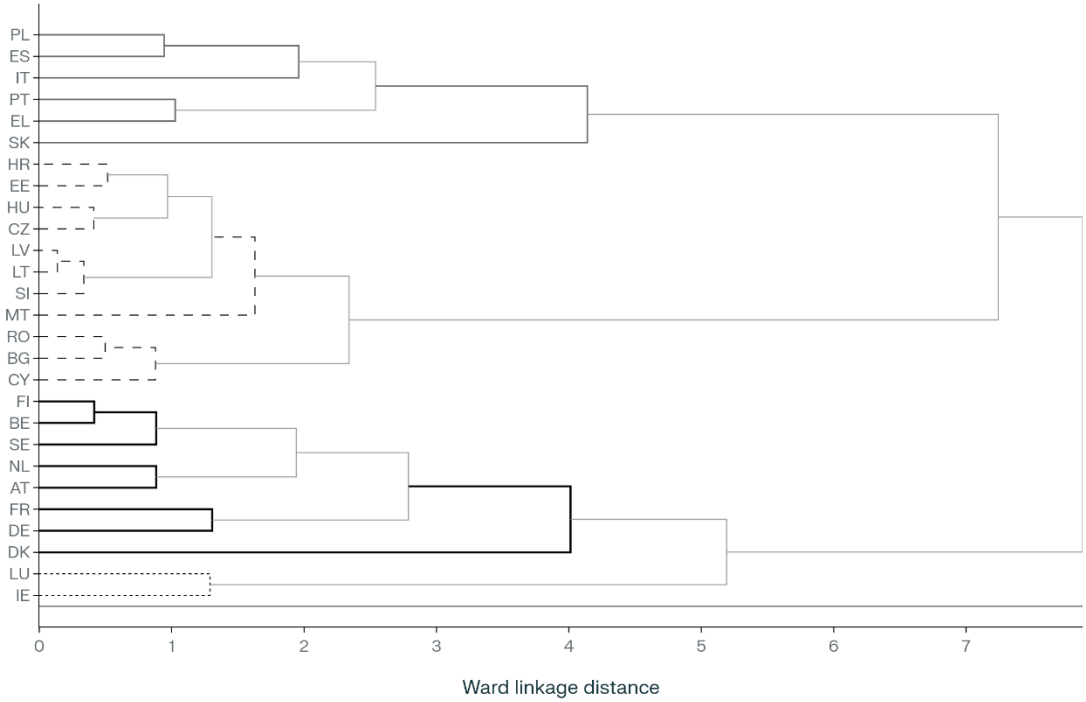


Figure 7.2. Clusters of EU countries by IPCEI engagement

Source: Authors' elaboration (hierarchical clustering dendrogram, Ward's method).

Goodness-of-fit metrics support the four-cluster solution: the Silhouette Score (0.40) reaches its maximum at k=4 among tested partitions (k=2 to k=7), indicating optimal within-cluster cohesion relative to between-cluster separation. The Calinski-Harabasz index also increases when moving from

three to four clusters and the Davies-Bouldin index decreases, both supporting the choice of four clusters as balancing separation and cohesion. These findings mean the solution captures meaningful groupings without artificially inflating distinctions and the interpretation above remains robust.

7.4.7. Summary of empirical patterns

Three main patterns emerge. First, absolute IPCEI funding and leadership are extremely concentrated in core economies, consistent with core-periphery theory. Second, a subset of peripheral and semi-peripheral countries achieved remarkably high IPCEI intensity that cannot be explained by their size or overall subsidy levels, highlighting the importance of context specific alignment and capacity (as suggested by strategic coupling and state capacity perspectives). Third, participation has not spread evenly: a pronounced multitier structure is evident, with certain lower capacity peripheral states consistently excluded and strong path dependence favouring early entrants. These findings provide a balanced empirical foundation for comprehending the distributive, strategic and integrative ramifications of the IPCEI instrument within the context of the European political economy.

7.5. Discussion

This study set out to ask whether IPCEIs, as a type of EU-backed interventionism, mitigate or exacerbate inequalities in state aid allocation across the European Union. Using comprehensive data covering all 27 Member States and ten IPCEI initiatives (2018-24), our multimethod analysis finds a complex answer. IPCEIs simultaneously concentrate absolute resources in core economies, enable selective peripheral upgrading through strategic coupling and produce emergent multitier participation patterns via differentiated integration dynamics. We next interpret these findings, consider theoretical implications, note methodological limitations and outline policy implications.

7.5.1. Interpreting the findings: conjunctural causation and complex outcomes

Our three core empirical findings (extreme core concentration, selective peripheral prioritisation and persistent multitier exclusion) are not contradictory but rather interrelated elements of a complex causal puzzle. Each operates at a different analytical level and together they illustrate conjunctural causation: outcomes shaped by multiple causal mechanisms interacting (Ragin, 2000; Mahoney, 2000). No single theoretical perspective fully accounts for IPCEI distribution patterns; instead, their combination produces the configuration we observe.

Core-periphery dynamics provide the underlying structure and explain the pronounced absolute concentration. Industrially advanced economies with diversified high-tech sectors, superior fiscal resources, established innovation ecosystems and structural influence over EU governance naturally dominate innovation-focused instruments. Germany and France's capture of 55 per cent of total IPCEI

funding, their coordination of 90 per cent of all initiatives and the core's collective ~67 per cent share (exceeding their ~65 per cent of EU GDP) directly confirm structural political economy expectations. Moreover, the institutional design of IPCEIs, demanding cofinancing, complex approval procedures, stringent additionality criteria, functions as a de facto gatekeeping mechanism privileging experienced, well-resourced actors embedded in EU networks (Eisl, 2022; Schmitz et al., 2025). Core dominance is thus not incidental but structurally embedded in how IPCEIs operate.

State capacity helps explain why peripheral outcomes vary so widely, from Slovakia's 22.8 per cent intensity to Bulgaria's zero participation, despite similar structural constraints. IPCEI participation imposes hidden institutional demands: analytical capacity to develop sophisticated proposals, specialised legal expertise in state aid law, multiyear fiscal coordination for cofinancing and interministerial alignment across industrial, innovation and regional policies (Besley & Persson, 2009, 2011). Our quantile regression confirms that wealth alone does not determine engagement: economic variables (GDP per capita, state aid per capita) were insignificant across most of the distribution. Instead, context-specific administrative capabilities make the difference. Estonia's participation in a cloud infrastructure IPCEI (leveraging decades of digital governance investment) contrasts sharply with Latvia and Lithuania's total exclusion despite comparable economic profiles and EU accession timelines, directly demonstrating capacity's decisive role. This explains the emerging multitier stratification: countries with above-threshold institutional effectiveness navigate IPCEI procedures successfully, while those lacking such capacity remain systematically excluded regardless of upgrading needs or sectoral potential.

Strategic coupling accounts for the exceptional intensity achievements of certain peripheral countries. Slovakia (22.8 per cent), Greece (11.6 per cent), Italy (10.2 per cent) and Portugal (6.9 per cent) attained disproportionate IPCEI intensity not despite their peripheral or semi-peripheral status but because they aligned preexisting sectoral assets with IPCEI project requirements (Yeung, 2021; Coe et al., 2004). Slovakia's automotive manufacturing base aligned perfectly with battery IPCEIs amid the electric vehicle transition; Greece's renewable energy endowment positioned it as a hydrogen production hub; Portugal leveraged its Atlantic wind resources for green hydrogen projects. The cluster analysis empirically validates this mechanism: these countries form a cluster defined by high-intensity commitment despite much lower GDP per capita, transcending predefined core-periphery categories. Quantile regression reinforces the point: at upper quantiles ($\tau \geq 0.75$), the peripheral/semi-peripheral coefficients reverse from negative to positive, indicating that successful peripheral participants adopt 'all-in' strategies distinct from core countries' more diversified approaches. Strategic coupling thus enables selective upgrading, but it presupposes foundational assets (sectoral specialisations, institutional readiness, network positioning) that most peripheral states do not possess. Such patterns are better understood not as deviations from structural hierarchy but as manifestations of what

economic geography terms strategic coupling: situations in which peripheral regions leverage specific sectoral capabilities, institutional readiness and their position within European value chains to seize upgrading opportunities (Yeung, 2016, 2021; Coe et al., 2004). These outcomes are selective rather than generalisable. They emerge when preexisting national strengths coincide with shifts in EU industrial priorities, making participation in IPCEIs feasible for some peripheral states but not others.

Differentiated integration explains how initial disparities harden into lasting multitier divisions through self-reinforcing feedback loops. IPCEI participation generates policy expertise, network relationships, institutional track records and credibility with Commission evaluators, advantages that lower barriers to future entry. Conversely, exclusion deprives countries of learning opportunities, network access and demonstration effects, raising the costs of subsequent engagement. Our temporal analysis illustrates this dynamic: core countries reached 50 per cent participation by the second IPCEI, while peripheral countries hit that threshold only by the fifth; after ten initiatives, several Eastern states (Bulgaria, Latvia, Lithuania, Cyprus, Slovenia) remain entirely absent. This reflects multitier rather than multispeed differentiation: a permanent division rather than a temporary lag (Schimmelfennig & Winzen, 2022). The emergence of Cluster 2 (core consistent participants) versus Cluster 3 (peripheral nonparticipants) empirically confirms a hardening stratification. Moreover, cluster analysis reveals the limits of economic determinism: Cluster 1 groups Ireland and Luxembourg, the EU's wealthiest states, as minimal participants, invalidating a simple wealth-driven model of participation. Context-specific factors (sectoral structure, institutional fit, strategic orientation) matter more than aggregate economic capacity.

7.5.2. Analytical and policy contributions

Our findings advance several debates. First, for EU industrial policy research, we provide the first systematic empirical assessment of IPCEI distribution across the entire EU-27 population. Prior work focused on individual cases (Schmitz et al., 2025), legal analysis of state aid rules (Boronat, 2024) or normative arguments about legitimacy (Meunier & Mickus, 2020) without comprehensive comparative data. By combining inequality metrics, nonparametric tests, quantile regression and clustering, we document not only that IPCEIs concentrate resources but how this concentration interacts with selective successes and exclusions, revealing a complex stratification invisible to single-method analyses.

Second, for core-periphery theory in European political economy, our results show that geographic and structural hierarchies remain highly consequential, but they do not fully determine IPCEI outcomes. Absolute funding concentration does validate structural predictions (Becker et al., 2010; Weissenbacher, 2019), but relative intensity patterns and the cluster results defy a linear core-periphery model. The peripheral group is bifurcated – seven countries excluded or marginal (Cluster

3), four achieving exceptional intensity (Cluster 4). This suggests that peripherality is not an immutable condition but the product of specific national capabilities and strategic decisions that enable or constrain participation. Peripheral success is clearly conditional rather than automatic, requiring specific conjunctures of sectoral fit, administrative capacity and strategic orientation that most peripheral states lack. This nuance refines dependency perspectives: structural hierarchies powerfully shape outcomes but do not entirely preclude upgrading by agile peripheral actors.

Third, for state capacity literature, we extend recent European integration scholarship (Bruszt & Campos, 2019; Vukov, 2025) by showing that capacity asymmetries directly translate into participation gaps in strategic domains beyond traditional single market integration. The Estonia-Latvia-Lithuania comparison provides quasi-experimental evidence: controlling for economic structure, EU accession timing and geography, variation in digital governance capacity (Estonia's strength) explains IPCEI participation differences. This validates Besley and Persson's (2011) argument that complex policy implementation hinges on multidimensional institutional capabilities, not merely political will or formal eligibility. Furthermore, the low R^2 values across our regressions, even with advanced techniques, suggest that qualitative institutional factors (specialisation, coordination mechanisms, policy networks) are more important than standard quantitative indicators. This supports the need for mixed-method approaches: statistical analysis to map broad patterns combined with indepth case studies to unpack the institutional specifics.

Fourth, for differentiated integration theory, we document emergent multitier patterns in a policy domain not usually covered by differentiation research. Schimmelfennig and Winzen's (2022) mapping focused on traditional areas (monetary union, Schengen, defence); we extend it to industrial policy, showing that even a voluntary opt-in instrument can produce similar stratification when capacity barriers exist. Our temporal and cluster analyses reveal path dependence: early exclusion often leads to continued absence and early participation begets repeated engagement. This self-reinforcing 'Matthew effect' in industrial policy threatens permanent stratification unless deliberate countermeasures (capacity-building, geographic balance criteria, greater EU cofinancing) intervene. The policy implication is stark: without proactive inclusiveness mechanisms, IPCEIs risk institutionalising a two-speed Europe in strategic industries, with troubling legitimacy consequences for peripheral states already sceptical of EU industrial governance (Bruszt & Vukov, 2024).

Fifth, for economic geography and global production networks, we contribute evidence of strategic coupling operating at the national level within a regional integration context, extending literature typically focused on subnational regions (Coe et al., 2004; Yeung, 2021). Slovakia, Greece and Portugal exemplify how peripheral countries (not just regions) can leverage sectoral assets to position themselves as indispensable nodes in transnational value chains, achieving influence beyond their structural position. However, our findings also support Manning and Richter's (2023) caution that

successful coupling requires 'upgrading against the odds': deliberate institutional work to build exchange relationships, not automatic gains from network insertion. The quantile regression result that peripheral high-performers concentrate resources intensively (high IPCEI intensity despite low state aid per capita) suggests coupling succeeds through strategic prioritisation rather than resource abundance, a finding relevant for industrial policy design in resource-constrained contexts.

7.5.3. Methodological limitations

Several caveats are warranted. Our analysis covers the full EU-27 population rather than a sample, so our statistical results describe pattern strength within this specific context rather than infer to other contexts or periods. We report statistics (H-statistics, rank-sums, effect sizes, confidence intervals) for transparency, but these are descriptive and not intended to support broad inferential claims beyond 2018-24.

With N = 27 and multiple covariates, regression models face limited degrees of freedom. We cannot control for the full range of potential confounders (for example, sectoral composition, R&D intensity, historical structural funds, political orientation, regulatory quality, network embeddedness) that qualitative case studies consider. The persistently low R^2 values (0.09-0.24 in our quantile regressions; 0.10 in OLS) underscore that much of IPCEI participation depends on context-specific qualitative factors not captured by parsimonious quantitative models. This is not a failure of the analysis but a substantive insight: institutional capacity, sectoral specialisation and strategic network positioning are crucial and understanding them fully requires qualitative investigation. Our quantitative results thus establish that heterogeneity and complexity exist, providing motivation and boundaries for follow-up case research.

IPCEI data reflect approved aid amounts authorised by the European Commission, not actual disbursements, absorption rates or realised impacts. Thus, we assess whether approved funding allocations were redistributive or accumulative in intent; we cannot evaluate here whether those funds were spent effectively or translated into industrial upgrades. For our purposes (testing whether IPCEIs function as cohesion or concentration instruments) these ex ante allocations reveal the policy's strategic priorities at approval. Future research tracking disbursement and outcomes (as data become available) can determine whether initial advantages persist, widen or narrow through implementation.

While our data span 2018-24, the small number of discrete IPCEI initiatives (ten projects) and uneven timing limit rigorous longitudinal analysis. Our approach remains fundamentally cross-sectional, comparing participation patterns across countries rather than tracing within-country changes over time. We document patterns, measure inequality, test differences and examine associations, providing a robust descriptive characterisation and evidence consistent with certain mechanisms, but we do not establish causation. Future studies employing quasi-experimental designs

(for example, synthetic control comparisons of IPCEI participants vs. similar nonparticipants) or process-tracing case studies could strengthen causal claims.

Quantile regression coefficients describe conditional quantile associations, not causal effects. The fact that GDP per capita's coefficient becomes positive at the 75th percentile does not prove wealth causes high intensity for top performers; unmeasured variables (for example, institutional quality, network centrality) could be driving the relationship. Moreover, quantile estimates can be sensitive to outliers at distribution tails; with N = 27, the 90th percentile result should be interpreted cautiously (Slovakia's exceptional case may exert outsized influence). We attempted alternative quantiles (0.60, 0.80) to check robustness, but sample-size constraints remain.

Cluster analysis involves discretionary choices (linkage method, distance metric, cluster number) that influence results. We applied Ward's method and identified a four-cluster solution that showed theoretical coherence (supported by pseudo-F and silhouette measures). Alternative approaches (k-means, Gaussian mixtures, different linkage criteria) might yield different groupings; testing multiple algorithms would assess robustness. Nonetheless, our core substantive finding, that countries cluster by participation strategy rather than purely by geography, held across reasonable variations, strengthening confidence in our interpretation.

Despite these limitations, the convergence of evidence across methods (inequality metrics, rank tests, quantile regression, cluster analysis) provides a robust portrayal of IPCEI distribution. The consistency of conclusions across these approaches suggests that the observed patterns (extreme concentration, selective peripheral success, emerging multitier stratification) reflect genuine dynamics rather than methodological artifacts.

7.5.4. Avenues for future research

A number of research avenues emerge from the findings. Longitudinal analyses tracking IPCEI participants over time could employ quasi-experimental methods (for example, synthetic control or difference-in-differences) to estimate causal effects on industrial performance, employment and innovation. Such analyses would reveal whether participation leads to measurable upgrading, whether benefits accrue primarily to core leaders and whether IPCEI-driven collaborations produce technological spillovers for peripheral actors or mainly reinforce core advantages.

Comparative case studies of successful and unsuccessful peripheral engagement (for example, Slovakia vs. Poland, both with automotive sectors) could clarify what enables effective strategic coupling. Process-tracing the proposal stage, consortium building and Commission interactions would help uncover the micro-foundations of how some peripheral states overcome the odds to participate.

Cross-national surveys of government officials and firms involved in IPCEIs could pinpoint perceived barriers and capacity gaps. Identifying which administrative challenges (technical expertise,

interministerial coordination, etc.) most hinder participation would inform targeted capacity-building and technical assistance initiatives.

Analysing where IPCEI funds go within countries would show whether concentration occurs internally. For example, much of Germany's €14.68 billion likely went to leading industrial regions (for example, Baden-Württemberg, Bavaria) and much of France's €6.27 billion probably concentrated in Île-de-France and Auvergne-Rhône-Alpes. Understanding intranational concentration would reveal if IPCEIs risk exacerbating regional inequalities domestically.

Finally, analyses could examine how IPCEI outcomes influence national preferences on industrial policy. States consistently excluded from IPCEIs may advocate alternative, more inclusive instruments (emphasising cohesion), whereas high-intensity peripheral participants might champion IPCEIs as vehicles for their advancement. Mapping these coalitions would clarify the political feasibility of reforms aimed at making IPCEIs more inclusive.

7.6. Conclusion

IPCEIs function as selective levelling mechanisms rather than engines of universal convergence. Absolute funding remains heavily concentrated in core economies, validating structural political economy predictions. However, exceptional peripheral intensity levels, driven by strategic coupling where domestic assets align with IPCEI priorities, suggest conditional upgrading opportunities. At the same time, permanent multitier membership patterns are emerging via capacity-based exclusion and differentiated integration feedback loops, threatening lasting stratification. These outcomes result from conjunctural causation: structural core-periphery dynamics, state capacity constraints, strategic coupling opportunities and differentiated integration mechanisms operate simultaneously, conditioning each other to produce complex, multilayered distributive effects.

Theoretically, our findings contribute to scholarship on EU industrial policy, core-periphery divisions, state capacity, differentiated integration and economic geography. Methodologically, we demonstrate the value of multimethod triangulation (combining inequality metrics, nonparametric tests, quantile regression and clustering) in capturing stratification dynamics that single-method analyses could miss. Empirically, we provide the first comprehensive assessment of IPCEI distribution across all Member States and initiatives, establishing baseline evidence for future causal and qualitative research.

Policy implications are clear: IPCEIs can advance both competitiveness and cohesion objectives, but only if designed with inclusiveness in mind. Geographic balance criteria, capacity-building support, facilitation of strategic coupling for weaker states, integration with cohesion policy and ongoing distributive monitoring could broaden meaningful participation beyond the current narrow circle.

Without such reforms, IPCEIs risk entrenching a two-tier Europe in strategic industries, with adverse consequences for territorial cohesion, the legitimacy of EU industrial governance and Europe's competitive position in an era of intensifying inter-bloc rivalry. The institutional choices made in designing the next generation of IPCEIs will determine whether this instrument becomes a flagship of inclusive European industrial strategy or an emblem of concentrated strategic capitalism.

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CHAPTER 8

Conclusion

8.1. Reframing the central puzzle

This thesis sought to ascertain the institutional factors that influence the governance model chosen for State aid measures concerning VHCN deployment, specifically focusing on the degree of subnational authorities' participation in implementation. Through a compilation of complementary articles spanning analysis of EU policy evolution, pan-European mapping, and comparative historical case studies, the research demonstrates that governance choices are not random but are deeply rooted in national administrative legacies and are structured by MLG relations. The findings support two primary, interwoven claims: (1) that EU-level policy change and persistent national diversity in governance models coexist, and (2) that national governance arrangements are simultaneously path dependent yet malleable.

The overarching context is defined by the transformation of EU State aid policy. Research shows the European Commission has gradually evolved from its initial role as an ordoliberal guardian (focused on strictly constraining subsidies) to an embedded facilitator (steering "good aid") and, most recently, to a geostrategic orchestrator. This evolution has widened the legitimate scope for State aid interventions in strategic areas, including digital infrastructure, thereby creating the political space for large-scale national broadband subsidy programs. Importantly, however, the Commission's guidelines primarily address technical and economic criteria, such as competition safeguards and open access obligations, but do not prescribe the governance model at the national level, leaving implementation architectures to be determined by Member States based on their domestic institutional realities (the principle of subsidiarity).

The systematic pan-European mapping of broadband State aid measures between 2003 and 2023 established a formal typology distinguishing governance models by the territorial level of decision-making (national vs. subnational measure) and the level of implementation authority (central vs. subnational). This revealed that diversity in governance models is the rule, not the exception. While a centralised model (national decision-making, central implementation) is predominant, particularly among countries that joined the EU since 2004, significant variation exists. The choice of model tracks foundational institutional features, such as the state structure (unitary versus federal) and administrative traditions (centralism versus strong local autonomy).

The core explanatory findings, derived from the comparative historical institutionalist analysis of France, Portugal, Spain, and the UK, reveal how these legacies shaped divergent paths. Portugal exemplifies persistent path-dependent centralisation, reinforced by institutional inertia. After the transition to democracy in 1974, the failure to implement mainland regionalisation meant that central control remained largely unchallenged. This led to a broadband State aid governance model that is highly centralised: national authorities design and execute programs, and local authorities have shown limited capacity or inclination to participate. Spain, despite operating under a quasi-federal system that grants considerable regional autonomy, also adopted a predominantly centralised broadband State aid model. This puzzle is resolved by a constitutional lock-in: exclusive central-state competence over telecommunications prevented systematic multi-level coordination in this sector, reinforcing central authority despite efforts by some autonomous communities to engage through tangential legal powers.

In contrast, France and the UK evolved toward more decentralised models, demonstrating institutional flexibility. France achieved decentralisation through institutional layering, where successive reforms from the 1980s progressively empowered local authorities in the telecom sector, creating local capacity and expectations that consolidated a decentralised governance model for broadband State aid. The UK initially implemented a devolved, locally led delivery model, leveraging the economic development mandates of devolved administrations and local councils (an example of conversion) to carry out national broadband objectives.

However, the UK case further illustrates the malleability of governance models. The UK's system shifted from a decentralised model to a more centralised regime under Building Digital UK (BDUK) and Project Gigabit in the 2020s, explained by a conjunction of factors. This recentralisation resulted from (i) governance performance failures, where persistent inefficiencies, delays, and a reliance on a single major supplier in the decentralised model eroded its legitimacy; (ii) political leadership and credit-seeking motives, driven by ambitious electoral pledges (like a universal gigabit target) and incentives to accelerate delivery by centralising accountability; and (iii) institutional and regulatory opportunity, provided by post-Brexit subsidy control autonomy and the conversion of BDUK into a dedicated executive agency. This trajectory illustrates how gradual change, through conversion and displacement, can culminate in a qualitatively distinct governance configuration without formal constitutional reform.

The analysis of Important Projects of Common European Interest (IPCEIs) provided a forward-looking perspective, confirming that the governance of strategic State aid remains complex and prone to distributive dilemmas. The use of an "IPCEI intensity" indicator showed that while the EU's largest economies dominate in absolute funding, several smaller or fiscally constrained countries (such as Slovakia, Greece, and Portugal) benefited disproportionately in relative terms, partially mitigating

traditional core-periphery asymmetries. This highlights that policy design matters: even supranational instruments that rely on national co-financing can promote inclusiveness if governed through adaptive mechanisms (for example, requiring broad participation to ensure smaller countries are included).

8.2. Theoretical contributions: advancing understanding of institutional dynamics

This thesis makes three major theoretical contributions to the study of institutions and governance.

It demonstrates the value of combining HI with MLG theory to explain policy variation in Europeanised domains. HI has long provided tools for analysing how domestic institutions evolve over time, and MLG offers concepts to describe how authority is allocated across different levels of government. By integrating these perspectives, the thesis reveals both the historical dynamics that explain why governance structures differ across countries and the contemporary vertical configurations of authority in a complex policy domain. Specifically, HI sensitises us to the fact that similar external pressures (such as EU targets or guidelines) elicit different responses not because some actors are irrational, but because institutional legacies constrain the set of politically viable options. Path dependence, critical junctures, and gradual change mechanisms are shown to actively shape current policy choices. Meanwhile, MLG provides a vocabulary for characterising the resulting governance structures (distinguishing centralised, decentralised, and hybrid models) and for analysing how authority is negotiated across governmental tiers. Together, these frameworks move analysis beyond describing 'what governance looks like' toward explaining 'how it came to be that way' and 'what this reveals about the constraining and enabling roles of institutions in shaping policy choices.'

The thesis contributes empirically to debates on adaptive capacity and institutional flexibility in MLG settings. The evidence shows that countries with more flexible institutional architectures (such as France and the UK) adjusted their governance arrangements more readily as policy demands evolved, whereas countries with more rigid structures (Portugal and Spain) encountered persistent difficulties in adjustment. However, the findings also demonstrate that flexibility is not an unalloyed good: the UK's recentralisation, despite being an outcome of institutional flexibility, was driven by governance performance failures and political credit-seeking rather than by efficiency gains. This suggests that a more nuanced understanding of adaptive capacity is required; one that separates the structural ability of institutions to change from the political incentives that determine whether that ability is used. In essence, institutions create opportunities and constraints, but political actors ultimately decide which opportunities to pursue and which constraints to uphold or break.

Finally, the research advances State aid scholarship by placing governance and institutional analysis at the centre of inquiry rather than treating them as contextual background. Much existing

work on State aid has been dominated by legal and economic perspectives, focusing on compliance with EU rules or the efficiency of subsidies. By contrast, this thesis reframes the agenda to consider how governance models (i.e. the way a state aid measure is decided and implemented, whether through a centralised bureaucracy, a negotiated multi-level arrangement, or a decentralised regional system) can influence not only efficiency but also equity, democratic legitimacy, policy innovation, and regional cohesion. In treating governance as an explanatory variable, the study opens new avenues for research. These include evaluating the equity outcomes of alternative governance models, assessing whether decentralisation fosters policy innovation or leads to fragmentation, and analysing how specific governance configurations affect policy learning and adaptation over time. In doing so, the thesis connects State aid policy to broader questions in public administration and federalism.

8.3. Empirical findings: institutional trajectories and governance outcomes

Across the four countries examined, the research identifies several mechanisms through which institutional factors shape the selection and evolution of governance models, operating differently according to each country's initial configuration.

Institutional path dependence and lock-in

Early institutional choices continue to structure behaviour decades later. France's 1982 decentralisation of infrastructure responsibilities created durable constituencies among local authorities and regional economic actors, making a decentralised approach to broadband implementation the natural option once broadband became a political priority in the 2000s. The UK's late-1990s devolution reforms similarly entrenched expectations of subnational involvement in infrastructure delivery. Portugal and Spain reflect the opposite pattern: once centralised structures were consolidated, they generated substantial inertia. In Portugal, a unitary administrative tradition and a historically centralised telecommunications sector produced a default model of central coordination and implementation. Spain's case is particularly interesting: despite its quasi-federal constitution granting to autonomous communities substantial powers in numerous domains, broadband governance remained centralised, suggesting that institutional design alone does not determine governance outcomes. Rather, the political economy of policy subsectors matters: telecommunications has historically been a centralised concern in Spain, and that sectoral legacy proved more influential than constitutional federalism.

Critical junctures and institutional openness

Critical junctures played a decisive role in enabling change. France's 1982 decentralisation statute and the UK's devolution reforms created openings for alternative governance models by weakening established patterns of authority. The 2009 EU Broadband State Aid Guidelines represented a

supranational critical juncture: by legitimising broadband as a domain for State aid, the guidelines created political space for experiments with different governance models (even though they did not dictate which model countries should adopt). Such junctures create possibility rather than automatic change. France's decentralisation did not immediately produce a decentralised broadband policy, but it established institutional capacity and supportive constituencies that made such a shift feasible once broadband rose on the agenda two decades later. The limited effect of critical junctures in Portugal and Spain (whether due to their absence or to failures to translate them into institutional reform) reinforces the strength of path dependence.

Institutional layering and gradual change

Rather than wholesale replacement, many changes occurred through layering (adding new elements to existing structures). France's broadband governance evolved through successive additions: first, the 1982 decentralisation vested local governments with competence; later, EU funding mechanisms (Cohesion Fund, ERDF) created incentives for regional projects; subsequently, national broadband plans incorporated decentralised elements while maintaining national coordination. The result is a layered structure where centralised and decentralised elements coexist. The UK similarly experienced layering: the National Broadband Scheme (2012) layered a national coordination mechanism atop existing devolved and local authority roles, creating a hybrid model. Spain and Portugal show less layering. Their centralised structures proved resistant to adding decentralised elements, suggesting that institutional rigidity limits the mechanisms through which gradual change can occur.

Administrative capacity and institutional feasibility

A recurrent finding is that governance model adoption relates to perceived feasibility given institutional capacities. Portugal's centralised model reflects not merely political choice but also an acknowledgment of limited subnational administrative capacity for managing complex infrastructure projects. Spain's centralised broadband program similarly reflected concerns about ensuring uniform standards and coherent implementation across diverse autonomous communities with varying technical and managerial capabilities. The implication is that decentralisation, while potentially beneficial, requires adequate subnational capacity; countries lacking such capacity face pressure to centralise, even if formal constitutional competencies would permit decentralisation. This suggests that governance model reform requires not only institutional design change but also investment in subnational institutional capacity.

Political leadership and credit-seeking incentives

The analysis of the UK's recentralisation reveals the importance of political leadership and short-term incentives. Central government recentralisation of broadband coordination was partly justified by alleged failures of MLG (coordination problems, implementation delays), but it was also driven by

the desire of political leaders to claim credit for infrastructure delivery. This motivation is more easily satisfied through centralised control. This finding suggests that governance model evolution is not solely a matter of institutional logic; it also reflects the strategic behaviour of political actors who modify governance arrangements to advance their interests. These dynamics highlight the need to recognise trade-offs between coordination, democratic accountability, and political incentives when assessing governance reform.

8.4. Limits and caveats

While this thesis provides a systematic account of how institutional factors shape broadband State aid governance, several limitations require acknowledgement:

Methodological and scope limitations

First, the governance model categorisation is based on formal arrangements as specified in European Commission notifications and official policy documents. In reality, formal structures may diverge from actual practice: for instance, a centralised scheme might still incorporate informal regional consultation, or a decentralised scheme might be tightly overseen by central authorities. This analysis captures *de jure* governance; de facto governance might differ. Future research employing implementation studies (examining how policies actually unfold) would complement these findings

Second, the process tracing approach, while valuable for identifying causal mechanisms, is inherently interpretive. The thesis interprets historical evidence (policy documents, legislative history, secondary scholarship) to construct narratives of institutional development. Other scholars might interpret the same evidence differently. To strengthen causal inference, the analysis employed established theoretical constructs (path dependence, critical junctures) and sought multiple forms of corroborating evidence, but the interpretive dimension remains.

Third, the thesis examines four countries selected via a Most Different Systems Design, which permits analytical leverage for identifying common mechanisms but limits generalisability. The findings may not apply to other EU member states (notably many in Eastern Europe) where post-communist institutional legacies and EU enlargement dynamics differed significantly from Western European cases. The intent is not to claim universal applicability.

Analytical limitations

Fourth, the analysis focuses on institutional factors while acknowledging (but not deeply analysing) alternative explanations: economic factors (cost of deployment, private operator capacity), technological factors (differences in fibre vs. wireless deployment needs), or fiscal capacity (national budgets available for public investment). These factors interact with institutional arrangements in

ways the thesis only partially explores. A more integrated analysis simultaneously modelling institutional, economic, and technological factors would strengthen understanding.

Fifth, the thesis examines governance model choice at a particular historical moment (primarily 2005–2020). Governance arrangements are not static; the UK's recentralisation (Chapter 6) exemplifies this. Future research should examine how governance models continue to evolve, particularly in light of the NextGenerationEU recovery framework and its multi-level partnership requirements.

Sixth, the thesis identifies institutions explaining governance choice; it does not quantitatively assess whether decentralised governance yields better coverage, equity, innovation, or cost-effectiveness than centralised governance. Such outcome analysis would be valuable but requires different methodological approaches (quasi-experimental designs, regression analysis) that were beyond this project's scope

Theoretical caveats

The analysis draws primarily on HI, assuming that inherited institutional configurations constrain and enable contemporary choices. Although the evidence supports this assumption, the thesis does not engage extensively with critiques of HI (for instance, rational-choice arguments that actors are less constrained than institutionalists assume, or that institutional explanations can become convenient post-hoc rationalisations). Nor does it fully resolve the structure-agency tension: while structural legacies shape behaviour, the research also documents cases (like the UK's recentralisation) where political leadership exercised significant agency, suggesting more flexibility than strict HI accounts might predict. Future theoretical work could integrate these perspectives more explicitly, balancing institutional determinism with actor-centric explanations.

8.5. Equity and normative implications

Implicitly, this thesis has treated different governance models as legitimate responses to institutional context, avoiding prescriptive judgments about which model is 'better.' However, governance models have equity implications. Decentralised models might empower local communities and tailor solutions to local needs, but they risk fragmentation and may disadvantage peripheral regions that lack administrative capacity. Centralised models can ensure uniform standards and efficiency but may ignore local needs and reduce opportunities for local democratic participation. The thesis documents these tensions but does not attempt to resolve them, as doing so would require normative judgments beyond the scope of positive institutional analysis. Nonetheless, policymakers should be aware that governance design involves trade-offs between equity, efficiency, participation, and uniformity that cannot be decided on technical grounds alone.

8.6. Practical implications for policymakers

The findings yield several practical implications for policymakers designing State aid programs for broadband, 5G, and other infrastructure investments.

An overarching implication is that the effectiveness of any governance model depends on its alignment with the institutional context. Decentralisation works well in contexts with capable subnational administrations, established local constituencies, and historical precedent for local governance; it may falter where these conditions are absent. Conversely, centralisation can ensure coherence and uniform standards, but only if central authorities have sufficient information and capacity to adapt solutions to diverse local conditions. Policymakers should candidly assess their institutional context (administrative capacity at different levels, experience with centralised vs. decentralised implementation, constitutional provisions, and the political economy of the sector) and design governance accordingly.

Another implication concerns the feasibility of governance reform. Moving from a centralised to a more decentralised model (or vice versa) faces institutional inertia and path dependence. Change is not impossible but typically requires either: (a) an exogenous shock (critical juncture) that weakens existing arrangements and opens space for reform, or (b) deliberate reform efforts combining legal/constitutional changes, capacity-building in target institutions, and the creation of political coalitions invested in the new model. Attempting governance reform without attending to these factors invites implementation failure.

Simply declaring a multi-level approach is not enough: effective MLG requires robust coordination instruments. Intergovernmental councils, formal information-sharing platforms, dispute-resolution procedures, and capacity-support mechanisms are necessary to make shared governance work. Chapter 3's finding that shared governance can improve aid effectiveness (per Gerli et al., 2023) comes with a qualifier: it works only when coordination is strong. Policymakers should proactively establish and fund such mechanisms rather than assume they will emerge organically.

Administrative capacity emerges as a further determinant. The centralised approaches in Portugal and Spain partly reflect concerns about the capacity of subnational bodies to manage complex broadband programs. If policymakers in a traditionally centralised system wish to decentralise implementation, they must first invest in capacity-building (for example, providing training for local administrators, developing IT systems for shared project management, and allocating financial resources to strengthen local institutions). Decentralising without building local capacity risks poor execution and policy failure.

Finally, even where formal structures are 'locked in,' incremental approaches can allow change. Policymakers can pilot multi-level arrangements on a small scale (e.g. allowing a willing region to lead

a broadband project) to build subnational experience and confidence. Legal reforms can enable voluntary local participation in what were central schemes, and funding incentives can reward multi-level collaboration. These gradual tactics (layering new practices onto old structures) can shift governance models over time without triggering the resistance that a wholesale reform might provoke.

8.7. Future research directions

This thesis opens several avenues for future research.

One avenue concerns implementation and outcomes. This thesis identifies institutional factors explaining governance model choice, but it does not systematically measure whether governance models affect policy outcomes. Future research could assess whether decentralised arrangements deliver broader coverage, greater equity, stronger innovation or superior cost-effectiveness compared with centralised approaches, and whether multi-level arrangements enhance efficiency or generate coordination costs that outweigh their benefits. Such outcome analysis requires tracking implementation experiences and policy results, which could be pursued through: (a) quantitative analysis of broadband deployment data (coverage, speed, cost per household passed) in relation to governance model across EU member states; (b) qualitative case studies of policy implementation examining coordination, innovation, and equity outcomes; (c) quasi-experimental designs exploiting natural variation in governance models within federal systems (e.g., comparing German Länder with different governance arrangements).

A second direction involves temporal dynamics. This thesis examines governance models primarily during 2005-2020, but governance is not static. The UK's recentralisation demonstrates change; NextGenerationEU's multi-level requirements may drive further change. Future research should: (a) continue longitudinal tracking of governance models over time, identifying emerging patterns; (b) examine how recent EU recovery funding, with its emphasis on multi-level partnership, influences member state governance arrangements; (c) analyse whether successful governance innovations in one domain (broadband) diffuse to other infrastructure domains (5G, energy transition, hydrogen); (d) investigate how governance models respond to technological change, shifts in private operator strategies, or political realignment.

A further research opportunity lies in sectoral comparison. Although the thesis focuses on broadband State aid, similar institutional logics may apply to other infrastructure or industrial policy domains. Future research could examine whether path dependence, critical junctures, and gradual change similarly explain governance model variation in: 5G deployment, renewable energy infrastructure, electric vehicle charging networks, water and sanitation infrastructure, transport

infrastructure. Cross-sectoral comparison could test whether institutional mechanisms are domain-general or sector-specific.

Expanding the geographical scope would also be valuable. Central and Eastern European member states experienced institutional ruptures after 1989 and subsequent deliberate state-building. It remains unclear whether HI, with its emphasis on continuity and gradual change, adequately captures governance choices in such contexts. Research addressing whether post-communist trajectories exhibit weaker path dependence or have developed new post-1989 institutional rigidities would test the applicability of historical-institutionalist frameworks in settings marked by institutional discontinuity.

Equity and distributive implications provide another line of inquiry. The thesis documents tensions between efficiency and territorial equity but does not measure distributional effects empirically. Future research could trace whether decentralised arrangements better serve rural or peripheral regions or instead exacerbate disparities, and whether centralised models ensure fairer territorial coverage or risk neglecting local needs. Explicitly tracking equity outcomes (coverage across regions, service quality, affordability, access for marginalised populations) in relation to governance models would refine understanding of these dynamics.

Further research is also justified at the EU level. Chapters 2 and 7 documented a shift in EU State aid governance toward a more strategic, permissive approach (the Commission as 'geostrategic orchestrator'). Research could examine whether similar shifts are occurring in other EU policy domains (e.g. fiscal policy coordination or industrial strategy) and how these changes affect member state autonomy. Does the EU's more active role lead member states to converge on certain governance practices, or does it accommodate national diversity? What are the implications for democratic accountability at the EU versus national levels?

Seventh, policy diffusion and transfer. The thesis found little evidence that countries directly emulate each other's governance models; each followed its own institutional trajectory. Still, policy learning might occur indirectly. Future studies could look at whether international networks or EU forums facilitate the sharing of governance practices, and whether countries with similar institutions (e.g. federal states) are learning from one another. Additionally, to what extent do EU funding rules or guidelines encourage convergence or allow divergence in governance approaches?

Finally, understanding how various stakeholders perceive different governance models would enrich the analysis. Surveys or interviews could explore whether local authorities prefer decentralised arrangements (for empowerment) or find them burdensome, how private telecom operators view dealing with central vs. multiple authorities, and how citizens perceive the legitimacy and effectiveness of different models. Stakeholder perspectives would help connect institutional analysis with questions of public satisfaction and democratic legitimacy.

8.8. Concluding remarks

Broadband connectivity has become critical infrastructure for economic opportunity, social inclusion, and democratic participation in contemporary Europe. Ensuring universal access to very high-capacity networks, a central goal of EU policy, requires sustained public investment. How this investment is governed (through centralised national schemes or decentralised multi-level arrangements) is not a technical matter of administrative preference but a fundamental issue with implications for policy effectiveness, regional equity, democratic legitimacy, and institutional resilience.

This thesis has demonstrated that governance model selection reflects deep institutional legacies and historical trajectories unique to each political economy. France's decentralised approach reflects decades of institutional reform creating local constituencies invested in infrastructure roles. The UK's MLG emerged from constitutional devolution, though its recent recentralisation reveals that governance models can shift in response to political incentives and perceived governance failure. Spain and Portugal's centralised approaches reflect path dependencies rooted in administrative tradition, sectoral governance history, and concerns about institutional capacity, even as their constitutional provisions might suggest otherwise.

The broader theoretical message is that institutions (understood not as constraints or opportunities alone but as configurations of formal and informal rules, historical legacies, and political relationships) matter profoundly for understanding policy governance in multi-level systems like the EU. However, institutions are not deterministic. Political actors navigate institutional constraints, making incremental adaptations and deliberate reforms to governance arrangements in order to serve their interests. Understanding policy outcomes in Europeanised but nationally administered domains requires attending simultaneously to institutional structure and agency, to path dependencies and critical junctures, to formal rules and informal practices.

At a moment when the EU is mobilising unprecedented resources for digital infrastructure through recovery funds and industrial policy instruments, and when ongoing policy challenges (climate transition, energy security, technological sovereignty) demand substantial public investment, the governance question becomes ever more urgent. How should member states design governance arrangements for these investments? There is no one-size-fits-all answer, but this thesis provides a framework and evidence for context-appropriate governance design: assess your institutional endowments, recognise path dependencies and opportunities for incremental reform, invest in multi-level coordination where decentralisation is pursued, build subnational capacity as a prerequisite for institutional change, and explicitly consider equity implications of governance choices.

Most fundamentally, this thesis argues that good governance is not simply good management or efficient administration. It is governance attuned to institutional context, sensitive to historical

legacies, designed with awareness of equity trade-offs, and executed with capacity and coordination mechanisms adequate to its ambitions. Broadband expansion, 5G deployment, climate infrastructure, and other major investments deserve such context-aware, reflective governance. By demonstrating how historical institutional analysis can clarify governance choices in contemporary policy domains, this thesis contributes to that project.

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