

ΠΑΝΤΕΙΟΝ ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΟΙΝΩΝΙΚΩΝ ΚΑΙ ΠΟΛΙΤΙΚΩΝ ΕΠΙΣΤΗΜΩΝ

PANTEION UNIVERSITY OF SOCIAL AND POLITICAL SCIENCES



DEPARTMENTS OF INTERNATIONAL, EUROPEAN AND REGIONAL STUDIES AND COMMUNICATION,
MEDIA AND CULTURE

MA in Digital Transformation: e-Diplomacy, e-Campaigning and Digital Law
Digital Law Specialization

MA THESIS

“The Essential Facilities Doctrine in the Digital Era: Current Status and the Road for
EU Digital Independence through a Competition Law Strategy”

Panagiotis Kokorakis-Papastavropoulos 1424M019

ATHENS, 2026

Supervisor:

Prof. Yannis Paramythiotis

Steering Committee:

Prof. Vassilis Hatzopoulos

Prof. Ria Papadimitriou

Prof. Yannis Paramythiotis



Copyright © Panagiotis Kokorakis-Papastavropoulos, 2026

All rights reserved. It is forbidden to copy, store and distribute the present dissertation as a whole or in part for commercial purposes. It is permitted to reprint, store and distribute for non-profit, educational or investigative purposes if only the source is mentioned and the present notice is preserved. Questions concerning the use of this dissertation for pro bono purposes must be addressed to the author.

The approval of the dissertation by the Panteion University on Social and Political Sciences does not indicate acceptance of the author's opinions.

Declaration of Non-Plagiarism and Assumption of Personal Responsibility

I declare that the work submitted in fulfillment of my academic requirements is entirely the product of my own original research and effort. I confirm that it does not improperly incorporate the intellectual property of others, nor does it include any material produced by generative artificial intelligence tools without appropriate acknowledgment and citation. Furthermore, I certify that any use of AI technologies in the preparation of this work was restricted solely to language editing and proofreading assistance, without influencing or generating the substantive academic content. I fully understand and accept personal legal and academic responsibility for any cases of plagiarism or other forms of academic misconduct that may be identified in relation to this work.

Acknowledges

I would like to acknowledge everyone who, directly or indirectly, contributed to the completion of this thesis. Their assistance and encouragement are sincerely appreciated.

Table of Contents

1. Introduction	4
2. The Essential Facilities Doctrine in EU Competition Law	8
2.1 Theoretical and legal background	8
2.2 Examples of case law analysis for EFD and abuse of dominant position	10
3. Challenges of Applying the Essential Facilities Doctrine to Digital Markets.....	12
3.1 Difficulties with applying the doctrine to specific sectors	13
3.2 Interaction with intellectual property rights	21
4. The Digital Markets Act: A New Regulatory Approach	23
4.1 Rationale for ex ante regulation of gatekeepers	23
4.2 Core obligations under the DMA.....	27
4.3 Relationship between EFD and DMA	29
5. The EU's Digital Competition Strategy in Global Context.....	34
5.1 Comparison with United States	34
5.2 Comparison with China	38
5.3 Analysis of the EU's approach to digital autonomy through law.....	41
6. Competition Law as a Tool for Digital Sovereignty	42
6.1 Discussion on whether existing and new competition tools can reduce EU dependence on foreign digital infrastructures	43
6.2 Strategic role of certain regulatory attempts	45
6.3 Risks and trade-offs.....	47
7. Conclusion	49
7.1 Recap of findings.....	49
7.2 Normative reflections and Policy recommendations	51
7.3 Future directions: generative AI, platform governance, quantum computing	52
BIBLIOGRAPHY	53

1. Introduction

As of today, the digital economy has given rise to new *essential* infrastructures that reconstruct competition and innovation, from vast datasets and cloud computing platforms to advanced AI models. European policymakers tend to worry that these critical resources are controlled by a few dominant (often non-EU) actors and companies, potentially undermining Europe's competitiveness and autonomy¹.

¹ European Parliament, European Parliamentary Research Service (EPRS), *Towards a more resilient EU: Digital sovereignty for Europe*, Ideas Paper (2020), p.1

Access to data in particular has been described as “essential for productivity and societal innovations”² yet many companies struggle to obtain the data or digital inputs they need. The stakes are high: cloud computing markets are heavily concentrated (Amazon Web Services and Microsoft together held an estimated 70–80% of Europe’s cloud infrastructure market in 2022³, and major AI providers like Google and Microsoft combine enormous financial resources with control over key inputs (proprietary AI models, cloud services, and data) that give them a structural advantage⁴. In this context, the relevance of the **essential facilities doctrine** in the digital era is coming even more to the surface. This doctrine – a principle of competition law – asks whether dominant firms controlling “bottleneck” resources should be required to share access in order to sustain competition. As Europe seeks greater *digital sovereignty* (defined as the EU’s ability to act independently in the digital world⁵), questions about mandatory access to digital infrastructures have moved to the centre of legal and policy debates.

Traditionally, EU competition law has been cautious in compelling access to a rival. **Article 102 TFEU** (Treaty on the Functioning of the European Union) prohibits abuse of a dominant position, and under this provision the essential facilities doctrine has developed through case law. In the landmark *Bronner* case (1998), the Court of Justice set out very strict conditions under which a refusal to supply a facility or service by a dominant firm could constitute an abuse under article 102 of TFEU. This would-be “essential” facility must be truly indispensable for doing business meaning that no realistic alternative exists, as well as that the refusal must likely eliminate effective competition in a downstream market, and there must be no objective justification for the refusal⁶. These stringent criteria have set a high bar – one largely met only in exceptional circumstances, such as where a dominant firm’s control of infrastructure or intellectual property created a chokehold on an adjacent market. Courts have mostly applied the doctrine to traditional sectors (railways, energy, telecoms) and were reluctant to force access in novel settings for fear of deterring investment and innovation. Indeed, in the context of digital markets, the *Bronner* test has often been seen as a near-Invincible obstacle. For example, while data could

² Elena Wiese, Martin Pflüger, and Kyra Harmes, Hogan Lovells, “Europe needs a data revolution – The role of competition law in access to data” (2024), source: <https://www.hoganlovells.com/en/publications/europe-needs-a-data-revolution-the-role-of-competition-law-in-access-to-data>

³ Antonio Manganelli, Daniel Schnurr, “COMPETITION AND REGULATION OF CLOUD COMPUTING SERVICES: ECONOMIC ANALYSIS AND REVIEW OF EU POLICIES”, CERRE report (2024), p. 65

⁴ Klaus Kowalski, Cristina Volpin, and Zsolt Zombor, European commission, Competition Policy Brief, “Competition in Generative AI and Virtual Worlds” (2024), p. 3

⁵ European Parliament, European Parliamentary Research Service (EPRS), *Towards a more resilient EU: Digital sovereignty for Europe*, Ideas Paper, (2020), p.1

⁶ NOERR, “Easier access to (non-)essential digital platforms and other facilities under EU antitrust rules?” (2025), source: <https://www.noerr.com/en/insights/easier-access-to-non-essential-digital-platforms-and-other-facilities-under-eu-antitrust-rules>

function as an essential input, “obtaining access to data on the basis of Article 102 TFEU can be challenging” due to the doctrine’s restrictive requirements⁷. To date, there have been very few (if any) EU competition decisions ordering a dominant firm to share datasets or AI algorithms with competitors, underlining the cautious approach.

Nonetheless, the rapid rise of *digital gatekeepers* – powerful platforms and tech firms that serve as gatekeepers to markets and data – has ignited a re-examination of these competition tools. Commentators observe that the essential facilities doctrine is “reawakening” after a period of decline, fueled by its potential to restrict the “gatekeeping power of online platforms”⁸. The basic logic of the doctrine – granting access to a facility or service for which there is no reasonable substitute – applies in occasions where a dominant digital platform abuses competition by denying interoperability or data access. Recent case law outcomes hint at a more nuanced application of Article 102 in digital contexts. Notably, the Court of Justice in *Slovak Telekom* (2021) indicated that when access to a network or platform is mandated by regulation, a competition authority is not required to apply Bronner’s strict indispensability test⁹. This point is predictive in light of new EU regulations: once the **Digital Markets Act (DMA)** – which imposes duties on designated digital “gatekeepers” – became applicable, certain access issues (for example, data sharing or interoperability obligations) are addressed ex ante by legislation¹⁰. Even more surprising is the Court’s preliminary ruling in *Google Android Auto* (2025), which reconstructed the application of the essential facilities doctrine for the platform economy. The Court suggested that if a dominant digital platform is designed for third-party use, refusing access or interoperability can be abusive even if the platform is not strictly indispensable for all competition in a downstream market¹¹. In

⁷ Elena Wiese, Martin Pflüger, and Kyra Harmes, Hogan Lovells, “Europe needs a data revolution – The role of competition law in access to data” (2024), source: <https://www.hoganlovells.com/en/publications/europe-needs-a-data-revolution-the-role-of-competition-law-in-access-to-data>

⁸ Nikolas Guggenberger, “The Essential Facilities Doctrine in the Digital Economy: Dispelling Persistent Myths” (2021), p. 301

⁹ Daniel Mandrescu, “Online platforms and the essential facility doctrine – a status update following Slovak Telekom and the DMA” (2021), source: <https://www.lexxion.eu/en/coreblogpost/online-platforms-and-the-essential-facility-doctrine-a-status-update-following-slovak-telekom-and-the-dma/#:~:text=facility%2C%20will%20constitute%20a%20filter,gatekeeper%20platforms%20and%20for%20their%20data>

¹⁰ Daniel Mandrescu, “Online platforms and the essential facility doctrine – a status update following Slovak Telekom and the DMA” (2021), source: <https://www.lexxion.eu/en/coreblogpost/online-platforms-and-the-essential-facility-doctrine-a-status-update-following-slovak-telekom-and-the-dma/#:~:text=facility%2C%20will%20constitute%20a%20filter,gatekeeper%20platforms%20and%20for%20their%20data>

¹¹ CJEU, Case C-233/23, *Alphabet Inc. and Others v Autorità Garante della Concorrenza e del Mercato*, Judgment of 25 February 2025, par. 87

other words, the elimination of *all* competition and the existence of an absolute necessity – basic requirements under Bronner – were not required in that scenario¹².

This jurisprudence signals an evolution of competition-law principles to better fit digital era. The essential facilities concept, which until now applied only to specific cases, is being adapted to ensure that digital ecosystems (app stores, operating systems, cloud platforms, and even large datasets) do not become an overwhelming obstacle for new entrants.

Parallel to this judicial evolution, the European Union has focused on a proactive regulatory strategy to ensure fairness and *digital independence*. The Digital Markets Act exemplifies this shift. Enacted in 2022–2023, the DMA is an *ex ante* regime targeting Big Tech “gatekeepers” with obligations intended to open up key digital services. These include requirements to allow business users access to the data they generate, ensure interoperability with the gatekeeper’s platform, refrain from self-preferencing, and enable data portability, among others (each aimed at preventing tactics that lock in users or lock out competitors). Although formally presented as a competition instrument, the DMA “embodies a geopolitical ambition to achieve European digital sovereignty”¹³. Its enactment reflects the EU’s reaction to *proactively* curb the power of a few large platforms over Europe’s digital market. In conjunction with the DMA, the EU has rolled out or proposed a suite of digital policies – from the Data Act (to facilitate data sharing) to the Digital Services Act and the upcoming AI Act – all geared towards increasing *contestability* and reducing dependency on foreign-controlled tech infrastructures. Observers note that true digital sovereignty will require a “regulatory ecosystem” of multiple tools, with the DMA working alongside traditional competition law enforcement and other digital regulations¹⁴. The overarching goal is twofold: to keep markets open and competitive (so that European innovators can thrive), and to ensure Europe holds control over critical digital resources and standards. In the words of the European Commission, Europe must not “lose control over [its] data, over [its] capacity for innovation, [or] over [its] ability to shape and enforce legislation in the digital environment”¹⁵. Competition law is thus being reshaped as a key part of a broader digital strategy, aligning economic objectives with questions of sovereignty and strategic autonomy.

¹² NOERR, “Easier access to (non-)essential digital platforms and other facilities under EU antitrust rules?” (2025), source: <https://www.noerr.com/en/insights/easier-access-to-non-essential-digital-platforms-and-other-facilities-under-eu-antitrust-rules>

¹³ Walid Chaiehloudj, *Journal of European Competition Law & Practice* (Oxford University Press), “Achieving Digital Sovereignty via the DMA: A European Illusion” (2025), p. 1

¹⁴ Walid Chaiehloudj, *Journal of European Competition Law & Practice* (Oxford University Press), “Achieving Digital Sovereignty via the DMA: A European Illusion” (2025), p. 1

¹⁵ European Parliament, European Parliamentary Research Service (EPRS), *Towards a more resilient EU: Digital sovereignty for Europe*, Ideas Paper (2020), p. 8

Against this background, this dissertation sets out two central research objectives: Firstly, it investigates *how and to what extent the essential facilities doctrine is applicable to the modern digital market*. Can the classic competition-law duty to share an “essential” input be successfully invoked for digital-era facilities like data sets, cloud services, or AI platforms? What adjustments or clarifications have recent cases provided, and do they suggest a greater role for mandated access in tech markets? Secondly, it examines *how the EU can leverage competition law – including new instruments like the DMA – to enhance its digital sovereignty*. In practical terms, this means exploring whether the EU’s competition-law toolkit can reduce dependence on dominant external technology providers by ensuring European businesses have fair access to the indispensable digital resources of the 21st century. The inquiry touches on the interface between antitrust enforcement and regulation: it asks whether Europe’s pursuit of *digital independence* can be achieved through a competition-law strategy that promotes open markets and interoperability, without restricting innovation.

In summary, this introduction has outlined the significance of the topic: as access to digital infrastructure becomes decisive and absolutely necessary for innovation and economic power, the applicability of the essential facilities doctrine and new potential competition policies stand at the top of European Union’s concerns in the digital era. The chapters that follow will delve into the evolution of these legal principles and their capacity to secure a more competitive and sovereign digital future for the European Union, addressing the research questions with a thorough analysis of legal doctrine, case law, and policy developments.

2. The Essential Facilities Doctrine in EU Competition Law

2.1 Theoretical and legal background

Origins in the US Antitrust Law

Although the Essential Facilities Doctrine (EFD) is today more developed in EU competition law, its conceptual origins lie in a set of early U.S. antitrust cases interpreted through the lens of academic scholarship from the 1960 ’s onwards. Importantly, the U.S. Supreme Court never formally recognised the doctrine as a standalone rule. Instead, scholars reconstructed it by analysing several key cases under § 1 and § 2 of the Sherman Act¹⁶. The historical and doctrinal development of the EFD therefore owes more to academic commentary of many U.S. antitrust scholars, rather than to explicit judicial articulation.

¹⁶ The Sherman Act, sections 1 and 2 (1890)

The 1912 Supreme Court decision *in the United States vs Terminal Railroad Association* Case is widely identified in American scholarship as the embryonic form of the EFD. Although the Court did not articulate a doctrine, academics consistently treat *Terminal Railroad* as the case where antitrust first grappled with monopoly control of a bottleneck facility. According to Lipsky and Sidak, *Terminal Railroad* is understood as the foundational case of the essential facilities doctrine, in that it recognised the competitive harm arising where a monopolist controls an indispensable facility and refuses access to rivals¹⁷. Maurer and Scotchmer emphasise that the case illustrates how the collective control of a non-duplicable bottleneck facility, combined with the denial of access to rivals, laid the foundation for later essential-facility reasoning and compulsory-access remedies¹⁸.

After *Terminal Railroad*, the Supreme Court further examined instances where dominant companies used their control over essential inputs to limit competition. In *Associated Press v. United States* (1945), the Supreme Court determined that the AP breached the Sherman Act by enforcing membership regulations that limited other newspapers' access to its news content, effectively excluding competitors from a valuable and difficult to replicate resource. The Court faced a similar issue in *Lorain Journal Co. v. United States* (1951), where the sole newspaper publisher in the area declined to accept advertisements from companies that advertised with a rival radio station. The Court determined that this behaviour represented an illegal effort to monopolize and ruled that the newspaper publisher is obliged to accept advertisements on equal footing. The theme appeared again in *Otter Tail Power Co. v. United States* (1973), which dealt with a vertically integrated electric utility that declined to provide wholesale power to municipalities aiming to create their own retail distribution systems. The Supreme Court determined that Otter Tail's tactic of restricting access to necessary transmission infrastructure was intended to safeguard its downstream position and thus constituted monopolization under §2 of the Sherman Act. Collectively, these rulings demonstrate the Court's acknowledgment that denying access to resources or facilities that rivals cannot feasibly replicate may be viewed as exclusionary behaviour. Although U.S. law has never codified an "essential facilities doctrine" as a standalone cause of action, these cases show how refusal-to-deal claims evolved into a specific variant of monopolisation analysis¹⁹.

Evolution in EU case law and Article 102 TFEU

¹⁷ Lipsky & Sidak, *Stanford Law Review*, Vol. 51, No. 5, pp. 1187-1249, "Essential Facilities" (1999), p. 1190-1191

¹⁸ Maurer & Scotchmer, SSRN Electronic Journal, "*The Essential Facilities Doctrine: The Lost Message of Terminal Railroad*", SSRN Working Paper (2014) p. 5-7

¹⁹ Robert Pitofsky, Donna Patterson and Jonathan Hooks, 'The Essential Facilities Doctrine under US Antitrust Law' (2002) 70 *Antitrust Law Journal* p. 445-448

Building on the early U.S. jurisprudence, the essential facilities idea was taken up and moulded into a far more structured doctrine in the European Union under Article 102 TFEU. Unlike the United States—where courts ultimately recoiled from general access duties—the EU embedded refusal-to-deal reasoning within a framework that places a “special responsibility” on dominant undertakings not to distort competition in the internal market, a principle traceable in “*Michelin*” (NV Nederlandsche Banden Industrie Michelin v Commission of the European Communities) and summarised in academic overviews²⁰. This responsibility informs the EU’s readiness to intervene where access to an indispensable input is withheld and the refusal risks eliminate effective competition. The classic starting point is *Commercial Solvents case* (further analysed below), where a dominant supplier’s pause of a crucial input to a downstream rival was condemned as abusive. Academic treatments use this case to mark the EU’s departure from a purely contractual freedom approach in favour of protecting competitive structure²¹. The Court of Justice then tightened and formalised the conditions in *Bronner case*, insisting—save for exceptional circumstances—on cumulative criteria of indispensability, elimination of effective competition, and absence of objective justification. Scholarly analyses emphasise that *Bronner* reframed essential-facility intervention around preserving competition (not competitors) and set a high bar for compulsory access²². The doctrine was subsequently adapted to intellectual-property and interoperability contexts: in *IMS Health* case the Court linked access duties to preventing the suppression of a new product for which there is potential demand, while in *Microsoft* case the General Court applied these principles to interoperability information, illustrating how network-market features (lock-in, switching costs) can magnify the foreclosure effects of a refusal. Scholarly accounts trace this evolution of the essential-facilities doctrine in EU competition law and contrast it with the U.S. retreat highlighted in *Trinko judgment*, underlining that EU enforcement continues to rely on Article 102’s abuse standard to calibrate when access must be granted²³.

2.2 Examples of case law analysis for EFD and abuse of dominant position

i) Commercial Solvents Corporation (CSC) vs Istituto Chemioterapico Italiano (ICI) case (C-6/73)

²⁰ Perić, G., Örebro University, School of Law, Psychology and Social Work, “EU Competition Law and Abuse of Dominance” (2022), p. 4

²¹ Graef I., Tilburg University, TILEC Discussion Paper, “Rethinking the Essential Facilities Doctrine for the EU Digital Economy” (2019), p. 2-3

²² Hatzopoulos V., College of Europe, “The EU Essential Facilities Doctrine” (2006), p. 21

²³ Graef I., Tilburg University, TILEC Discussion Paper, “Rethinking the Essential Facilities Doctrine for the EU Digital Economy” (2019), p.3-6 & 9-10

Case: CSC was the only commercial supplier in the EU of the key raw material needed to manufacture ethambutol (tuberculosis drug). ICI had been purchasing this material from CSC for years and depended on the material to produce its product. The CSC stopped supplying the material to ICI to reserve it for its own subsidiary company that was entering the downstream market.

CJEU ruling: There is abuse of dominant position, as the refusal to supply by CSC eliminates competition and is not objectively justified (favors own subsidiary company).

The court's ruling anticipates the logic of the Essential Facilities Doctrine, even though it did not use the term "essential facility" at the time.

ii) Oscar Bronner GmbH & Co KG vs Mediaprint Zeitungsverlag (C-7/97)

Case: Mediaprint operated the only nationwide early-morning home-delivery network capable of distributing daily newspapers efficiently across Austria. Bronner asked to be granted access to Mediaprint's delivery network to distribute its own newspaper. Mediaprint refused, and Bronner claimed this refusal was an abuse of dominance under Article 102 TFEU because the delivery system allegedly constituted an "essential facility." The Austrian courts referred to the CJEU for preliminary questions.

CJEU response: The Court ruled that Mediaprint's refusal did *not* constitute an abuse of dominant position, establishing very strict criteria:

1. Indispensability:
The input must be objectively *indispensable* for carrying on the competitor's business. The Court held that Bronner could use *alternative distribution methods* (postal delivery, kiosks), even if more costly.
2. Elimination of all competition:
Refusal must be likely to eliminate all effective competition in the downstream market. Not demonstrated in Bronner's case.
3. No objective justification:
The refusal must lack any valid justification. The Court found Mediaprint could justify refusing to share its costly, investment-heavy delivery system.

iii) IMS Health GmbH & Co. OHG vs NDC Health GmbH & Co. KG (C-418/01)

Case: IMS owned copyright over the 1860 brick structure, a detailed, widely used regional breakdown of the German market. Pharmaceutical companies demanded this exact format for compatibility with existing datasets. NDC wanted to enter the market and asked IMS to license the brick structure. IMS refused, invoking its intellectual property rights. NDC claimed this refusal was an abuse of dominance under Article 102 TFEU because access to the brick structure was essential for competing effectively. The German court sent a preliminary reference to the Court of Justice.

CJEU response: The Court did not rule that IMS Health's refusal was abusive but clarified that a compulsory licence may only be imposed in exceptional circumstances. A refusal to license IP rights can amount to an abuse under Article 102 TFEU only where the input is indispensable, the refusal would eliminate effective competition, it would prevent the emergence of a new product, and the refusal lacks objective justification. The application of these criteria was left to the national court.

iv) Microsoft Corporation vs Commission of the European Communities (T-201/04)

Case: Microsoft allegedly refused to disclose interoperability information necessary for competing work group server operating systems to communicate fully with Windows client PCs. Because Windows was installed on over 90% of PCs, rivals argued that lack of interoperability prevented them from competing effectively in the downstream server market. The Commission held that Microsoft's refusal amounted to an abuse of dominance under Article 102 TFEU and also found illegal tying of Windows Media Player to Windows. Microsoft appealed to the General Court

General Court's ruling: The General Court upheld the Commission's finding that Microsoft abused its dominant position by refusing to supply indispensable interoperability information and by tying Windows Media Player to Windows. The Court confirmed that the refusal risked eliminating effective competition and hindered technical development, thereby justifying a compulsory licensing remedy.

Microsoft case represents the most far-reaching application of the essential facilities doctrine in the EU digital context, with the Court confirming that refusal to supply indispensable interoperability information capable of eliminating effective competition amounted to an abuse of dominance.

3. Challenges of Applying the Essential Facilities Doctrine to Digital Markets

3.1 Difficulties with applying the doctrine to specific sectors

i) Cloud infrastructure

The idea that dominant cloud infrastructures such as Amazon Web Services (AWS), Microsoft Azure or Google Cloud might function as “essential facilities” is intuitively appealing: they increasingly constitute critical infrastructure on which a wide range of digital services, including AI, depend. Recent OECD work underlines that cloud services have become indispensable technical infrastructure for businesses and governments, and that markets are highly concentrated around a few “hyperscalers”, with Amazon and Microsoft cloud computing services together reaching up to 80% market shares in some large economies, while Google’s holding the 3rd place²⁴. However, when measured against the strict conditions developed in EU case law (Magill, Bronner, IMS Health, Microsoft), the essential facilities doctrine proves difficult to apply to cloud infrastructure.

First, defining the relevant “facility” in cloud markets is conceptually challenging. Classical EU essential-facility cases—such as *Bronner* (newspaper-distribution system) or *IMS Health* (copyright-protected brick structure)—concerned clearly delimited inputs whose replication would be commercially irrational and whose exclusion could eliminate downstream competition. The OECD observes that cloud computing services consist of multiple, interrelated layers and functionalities, making it difficult to delineate a single competitive input or relevant market, while competition concerns are more often linked to switching costs, interoperability constraints, and ecosystem dependencies rather than to clearly bounded infrastructure elements.²⁵ By contrast, cloud infrastructure consists of a vertical stack of interdependent layers, including geographically distributed data centres, virtualisation technologies, orchestration tools, APIs, data-transfer systems, and security/compliance architectures. The CERRE report shows that competition concerns in cloud markets arise not from a single input, but from the interaction of portability, interoperability and switching barriers across these layers²⁶. Treating such a multi-layered ecosystem as a unified “facility” risks oversimplifying market dynamics, while isolating one layer (e.g., an API or accelerator) raises unstable line-drawing problems.

Secondly, the indispensability requirement from Bronner sits uneasily with the economic features of cloud markets. Under the traditional EU Bronner test, as

²⁴ OECD, *Competition in the Provision of Cloud Computing Services*, OECD Roundtables on Competition Policy Papers, No. 323 (2025), p.10

²⁵ OECD, *Competition in the Provision of Cloud Computing Services*, OECD Roundtables on Competition Policy Papers, No. 323 (2025), p. 20-25

²⁶ CERRE – *Competition and Regulation of Cloud Computing Services: Economic Analysis and Review of EU Policies* (2024), p.57

mentioned above, a facility is “indispensable” only if there are no real or potential alternatives and duplication is practically or economically impossible. Vargiu emphasises that EU courts have set a very high threshold for indispensability, partly to protect incentives to invest and innovate²⁷. Guggenberger similarly notes that Chicago and Harvard school critiques led courts to confine EFD to exceptional circumstances where no viable alternative exists²⁸. In cloud computing, however, incumbents can argue that potential alternatives exist: rivals can build or lease data centers, users may adopt multi-cloud or hybrid architectures and certain workloads can remain on-premise. The OECD background note observes that the cloud computing services market is characterised by high market concentration and significant barriers to switching, including technical, contractual and financial obstacles that may limit customer mobility and competitive rivalry²⁹. This makes it challenging to demonstrate that access to a specific hyperscaler’s infrastructure is indispensable in the strict Bronner test’s sense, even if, in practice, network effects and ecosystem lock-in severely constrain switching.

Thirdly, cloud-specific forms of lock-in are not easily captured by the EFD focus on a single refusal to deal. Ünver explains that vendor lock-in in cloud markets typically arises from interoperability constraints and proprietary technical design choices that raise switching costs and impede migration, rather than from an outright denial of access³⁰. OECD similarly highlights that contractual practices (e.g. complex discount structures, restrictive licensing, and charges for moving data off the cloud) can reinforce de facto dependence on a particular provider³¹. Yet EFD is tailored to situations where a dominant firm refuses to supply an input to a rival, not where it supplies access but designs its ecosystem so that users become effectively “captive.” This structural lock-in is more naturally addressed through ex ante rules on data portability and interoperability, such as those in the Data Act, than through case-by-case findings of abusive refusal to supply.

A further difficulty is that cloud infrastructure is heavily related to proprietary know-how and IP-protected elements, raising questions similar to those discussed by Rok Dacar in the context of Big Data. Dacar argues that the criteria developed in IMS Health and Microsoft were crafted for facilities protected by copyright or patents,

²⁷ Marco Vargiu, ‘Revitalisation of the Essential Facilities Doctrine in EU Competition Law, The complementarity with the new Digital Markets Act’ (2023), p. 109-110

²⁸ Nikolas Guggenberger, Yale Journal Of Law and Technology, Volume 23, “The Essential Facilities Doctrine in the Digital Economy: Dispelling Persistent Myths” (2021), p. 310

²⁹ OECD, *Competition in the Provision of Cloud Computing Services, OECD Roundtables on Competition Policy Papers*, No. 323 (2025) p. 5-10

³⁰ Mehmet Bilal Ünver, Telecommunications Policy p 154-170 “What cloud interoperability connotes for EU policy making: Recurrence of old problems or new ones looming on the horizon?” (2019), p. 156-160

³¹ OECD, *Competition in the Provision of Cloud Computing Services, OECD Roundtables on Competition Policy Papers*, No. 323 (2025) p. 1-2

and warns against mechanically extending them to alleged essential facilities that are not clearly IPR-protected³². While parts of a cloud stack (e.g. software, AI models, proprietary datasets) are covered by IP rights, the infrastructure is also characterised by trade secrets and confidential architecture that firms legitimately seek to protect. Vargiu highlights that where the essential facility consists of an intangible asset protected by intellectual property, EU case law applies a heightened threshold for intervention, requiring “exceptional circumstances” in order to balance access obligations with the need to preserve incentives to innovate³³.

Fourth, the doctrine’s “new product” and “elimination of competition” conditions are hard to operationalise in cloud settings. Vargiu shows that, particularly in IP-related cases such as Magill and IMS Health, EU courts have required that access is necessary for the emergence of a new product for which there is unsatisfied consumer demand, and that refusal risks eliminating all competition in a downstream market³⁴. In cloud markets, however, the competitive harm often manifests as a gradual narrowing of choice and higher switching costs rather than a clear elimination of all competition³⁵. CERRE emphasise that there are multiple levels of competition (between hyperscalers, niche providers and between different deployment models), and that competition authorities are concerned with cumulative barriers to entry and expansion rather than a simple binary of “competition/no competition.” Demonstrating that a refusal to give access to a specific cloud resource meets the exacting standard of eliminating all effective competition may therefore be difficult, even in highly concentrated markets.

Finally, several authors suggest that the enforcement toolkit for digital markets is shifting away from the Essential Facilities Doctrine towards ex ante regulation and tailored interoperability mandates. Graef argues that the essential facilities doctrine has limited effectiveness in EU digital markets and should be reconsidered in light of regulatory and policy developments outside traditional competition law that address access and gatekeeper power³⁶. Guggenberger argues that although the essential facilities doctrine could in principle address digital bottlenecks, concerns relating to administrability, error costs and innovation incentives have led courts to apply it

³² Rok Dacar, article “The Essential Facilities Doctrine, Intellectual Property Rights, and Access to Big Data” (2023), p. 1491-1495, source: <https://link.springer.com/article/10.1007/s40319-023-01396-7>

³³ Marco Vargiu, ‘Revitalisation of the Essential Facilities Doctrine in EU Competition Law, The complementarity with the new Digital Markets Act’ (2023), p. 108-110

³⁴ Marco Vargiu, ‘Revitalisation of the Essential Facilities Doctrine in EU Competition Law, The complementarity with the new Digital Markets Act’ (2023), p. 108-110

³⁵ CERRE – *Competition and Regulation of Cloud Computing Services: Economic Analysis and Review of EU Policies* (2024), p.92-94

³⁶ Graef I., Tilburg University, TILEC Discussion Paper, “Rethinking the Essential Facilities Doctrine for the EU Digital Economy” (2019), p. 24-27

restrictively and to favour more flexible regulatory approaches³⁷. In the specific case of cloud markets, CERRE concludes that problems of coherence between multiple EU instruments (DMA, Data Act, cloud-specific initiatives) need to be resolved through guidance and a “cloud rulebook” rather than through expansive EFD-based duties to deal³⁸.

In conclusion, the literature suggests that cloud infrastructure illustrates both the appeal and the limits of the essential facilities doctrine in digital markets. On one hand, cloud services are rapidly assuming the characteristics of critical digital infrastructure, functioning as foundational inputs for AI development, data-driven industries, public services, and the operation of the wider digital economy. Their increasing concentration in the hands of a few hyperscalers, raises concerns that echo the classical bottlenecks addressed in earlier EFD jurisprudence: reliance on a centralised, non-substitutable infrastructure with high barriers to entry, strong economies of scale, and significant lock-in effects. In this sense, cloud markets revive the intuition that competition law may need a mechanism, such as EFD, to ensure that dominant actors do not foreclose downstream innovation or restrict access to indispensable technological resources.

At the same time, however, scholars warn that the multi-layered, modular, and innovation-driven nature of cloud ecosystems resists the relatively rigid structure of the Bronner and Microsoft tests. Cloud services, as mentioned above, integrate physical data centres, proprietary software stacks, orchestration layers, APIs, and AI modules, none of which map neatly onto the kind of discrete, clearly identifiable facilities that earlier EFD cases addressed. The doctrine’s strict criteria—especially the tests of indispensability, elimination of competition, and the exceptional-circumstances threshold when IP or substantial investment is implicated—are difficult to satisfy in an environment characterised by rapid technological evolution and overlapping forms of competition. Administrability concerns are equally salient: forced access to cloud infrastructure would require competition authorities to intervene deeply in complex technical architecture and potentially compel disclosure of trade secrets or proprietary know-how, which courts have historically been reluctant to mandate.

For this reason, the emerging consensus in the literature is not to abandon the essential facilities doctrine, but to recalibrate its use. Authors such as Graef, Guggenberger, Vargiu and Dacar argue for a cautious, context-sensitive application of EFD, recognising its relevance for identifying and addressing digital bottlenecks, while acknowledging that it cannot serve as the primary regulatory tool for cloud

³⁷ Nikolas Guggenberger, *Yale Journal of Law and Technology*, Volume 23, “The Essential Facilities Doctrine in the Digital Economy: Dispelling Persistent Myths” (2021), p. 320–327

³⁸ CERRE – *Competition and Regulation of Cloud Computing Services: Economic Analysis and Review of EU Policies* (2024), p. 7

markets. They advocate complementing EFD with ex ante regulatory instruments, including the interoperability and data portability obligations found in the Data Act, targeted provisions of the Digital Markets Act, and sector-specific rules for cloud procurement and switching. Those instruments are designed to address ecosystem-level dynamics, lock-in, and structural dependence without requiring a finding of abusive refusal to supply, in which EFD cannot apply accordingly. In this hybrid approach, the essential facilities doctrine remains a useful doctrinal backstop for extreme cases of exclusion, but effective governance of cloud infrastructure relies on a broader regulatory architecture more harmonized to the structural and technical realities of the digital economy.

ii) Large Language Models (LLMs) and training data access

Large Language Models (LLMs) such as GPT-5, Llama, Claude or Gemini increasingly function as *general-purpose technologies* that underpin downstream innovation across a wide array of digital markets. They provide foundational capabilities, from natural language processing to multimodal generation, that businesses, developers, and public administrations increasingly rely on. The EU Competition Policy Brief notes that generative AI markets are characterised by vertically integrated players that combine upstream inputs — including cloud infrastructure and data centre services — with downstream AI systems and consumer applications, creating value chains where access to key inputs and platforms is central to competition³⁹. This architecture invites the question of whether the Essential Facilities Doctrine (EFD) could, in principle, apply to LLMs as key digital inputs. However, as with cloud infrastructure, the doctrinal, technical, and economic characteristics of LLMs reveal significant obstacles to treating them as “essential facilities” under EU competition law.

A first difficulty lies in identifying the relevant “facility” within the LLM ecosystem. Traditional EFD jurisprudence presupposes a specific, well-defined input—such as a physical infrastructure (ports, railways) or a clearly identifiable intellectual property-protected asset (copyright databases in IMS Health or the interoperability information in Microsoft). Yet, as Martens (2023) argues, LLMs are not monolithic assets but complex artefacts comprising several layers (just like cloud infrastructure): massive datasets, proprietary model weights, specialised compute infrastructure, fine-tuning datasets, and platform-level APIs. Each of these components plays a different economic and technical role, and none easily maps onto the idea of a single

³⁹ Klaus Kowalski, Cristina Volpin, and Zsolt Zombor, European commission, Competition Policy Brief, “Competition in Generative AI and Virtual Worlds” (2024), p. 2-3

upstream bottleneck facility⁴⁰. Moreover, LLM deployment occurs through varying forms, open-weights models, closed proprietary APIs, fine-tuning services, or downstream application integration, making the facility highly contextual. This complexity mirrors the challenge Graef (2019) identifies for digital platforms more generally: digital “facilities” often consist of *interdependent systems* rather than discrete assets, which complicates the EFD’s foundational requirement of a clear input denial⁴¹.

A further difficulty in applying the Essential Facilities Doctrine to LLMs lies in their structural and functional opacity. Unlike cloud infrastructure, whose layers, while complex, remain technically observable and contractually specifiable, generative AI models operate through highly interdependent parameters, training data, and deployment-phase feedback loops. As noted in the DG Competition Policy Brief, model performance and competitive significance emerge from ecosystem dynamics and user interaction rather than from a single, isolable input. This complicates the identification of a clearly delineated “facility” and undermines the feasibility of operationalising access remedies, which presuppose a knowable and separable asset capable of being shared under controlled conditions⁴². LLMs, in contrast, are probabilistic systems whose internal logic (i.e., the model weights) is not interpretable in a way analogous to the information in Microsoft’s interoperability case or the brick structure in IMS Health. The EU’s strict standards for access obligations have never been applied to an asset whose functional properties defy precise articulation, making LLMs an outlier for the doctrine.

Aside from opacity concerns, foundation models and large language models (LLMs) also pose challenges because they are continuously updated systems rather than static assets. OECD reports emphasise that generative AI models are subject to recurring improvements, retraining and parameter updates, which can significantly modify their behaviour and performance after initial deployment. Martens also notes that the development of generative AI involves frequent model updates, new training cycles and rapid capability improvements, reflecting a pace of technological evolution that is substantially faster than in traditional digital markets⁴³. This evolution contrasts with the assumptions underlying the essential facilities doctrine,

⁴⁰ Bertin Martens, Policy Brief “Why artificial intelligence is creating fundamental challenges for competition policy”, 2024, source: <https://www.bruegel.org/policy-brief/why-artificial-intelligence-creating-fundamental-challenges-competition-policy>

⁴¹ Graef I., Tilburg University, TILEC Discussion Paper, “Rethinking the Essential Facilities Doctrine for the EU Digital Economy”, 2019, p. 6-10

⁴² Klaus Kowalski, Cristina Volpin, and Zsolt Zombor, European commission, Competition Policy Brief, “Competition in Generative AI and Virtual Worlds” (2024), p.2-5 & 6-8

⁴³ Bertin Martens, Policy Brief, “Why artificial intelligence is creating fundamental challenges for competition policy” (2024), source: <https://www.bruegel.org/policy-brief/why-artificial-intelligence-creating-fundamental-challenges-competition-policy>

which—following classical case law—presumes a stable and clearly identifiable input whose essential characteristics remain constant once access is granted. According to the OECD, the technical complexity and rapid pace of change in AI markets pose significant challenges for competition authorities, meaning any effective intervention, including potential access requirements, would require ongoing monitoring, specialist expertise, and adaptive approaches to keep pace with evolving infrastructure and services⁴⁴. These dynamics make it difficult to design remedies that remain effective over time, and the OECD stresses that such fast-moving markets raise administrability and monitoring problems that exceed those encountered in more static, conventional infrastructure sectors.

A further obstacle to applying the essential facilities doctrine to LLMs lies in the distinctive structure of competition in model markets. Whereas cloud services exhibit relatively stable value chains, the LLM ecosystem is characterised by rapid technological turnover and increasing substitutability among models. The OECD notes that generative AI markets are still evolving and include multiple stages, from foundational model training through fine-tuning and deployment, with diverse competitive dynamics that competition authorities are monitoring as they develop over time⁴⁵. This modularity undermines any *Bronner*-style indispensability claim. As Vargiu explains, the indispensability criterion is particularly difficult to satisfy in fast-moving and innovation-intensive digital environments, because technological progress constantly generates alternative solutions and weakens claims that access to one input is unavoidable⁴⁶. In the case of LLMs, this dynamic is even more pronounced: performance gaps are narrowing, and downstream actors increasingly adopt model-agnostic strategies that distribute tasks across multiple models. This makes it challenging to demonstrate that any single LLM constitutes an “unavoidable trading partner,” even for a limited period.

The LLM ecosystem also challenges the “new product” criterion from *IMS Health* and *Microsoft*. In those cases, the Court held that compulsory access may be justified where refusal prevents the emergence of a novel product that consumers demand. However, LLMs function as general-purpose technologies rather than discrete, product-defining inputs. The Commission’s 2024 Policy Brief notes that generative AI markets involve multiple layers in the value chain, with distinct upstream inputs (such as data, cloud capacity and talent) and downstream generative model deployment services, indicating that competition dynamics are shaped by a broad set

⁴⁴ OECD, ARTIFICIAL INTELLIGENCE PAPERS No. 18, OECD Publishing, “COMPETITION IN THE PROVISION OF CLOUD COMPUTING SERVICES” (2025), p. 39

⁴⁵ OECD, ARTIFICIAL INTELLIGENCE PAPERS No. 18, OECD Publishing, “ARTIFICIAL INTELLIGENCE, DATA AND COMPETITION” (2024), p. 4

⁴⁶ Marco Vargiu, ‘Revitalisation of the Essential Facilities Doctrine in EU Competition Law, The complementarity with the new Digital Markets Act’ (2023), p. 115-118

of components beyond the core foundation model itself.⁴⁷ Martens (2023) observes that generative AI innovation occurs largely at the “complementary layer,” not solely at the foundation layer⁴⁸. Consequently, a developer denied access to a particular frontier LLM can still introduce new, differentiated products using alternative models or hybrid architectures. The *Microsoft* “new product” test is therefore difficult to satisfy in the LLM context.

Another structural challenge is the functional opacity of LLMs. The Commission’s Policy Brief (2024) emphasises that the performance and competitive significance of generative AI models result from complex interactions between training data, computing resources, deployment conditions, and ecosystem dynamics, rather than from a single isolable input. As a result, identifying stable and administrable characteristics of the model as a “facility” becomes difficult. This poses a challenge for the application of the Essential Facilities Doctrine, which presupposes that the essential characteristics of the facility are sufficiently identifiable to be subject to an access remedy⁴⁹. Graef’s analysis of digital platforms highlights the difficulty of defining and enforcing access obligations in digital environments, where essential competitive inputs often consist of complex, interdependent systems rather than discrete, isolable assets, thereby complicating the application of the traditional essential facilities doctrine⁵⁰. LLMs push this problem further, because their functional boundaries cannot be clearly delineated and their internal logic is not interpretable in the manner of traditional interoperability information. This creates doctrinal friction: a facility that cannot be sufficiently specified or reliably replicated is not a workable target for EFD-based remedies.

A related obstacle is that LLMs are continuously updated artefacts. The OECD notes that generative AI models are not static: deployers may fine-tune or even continuously train models during operation, which can significantly affect performance and behaviour, and providers can further adjust models using feedback data and A/B testing based on real-world use⁵¹. Any access remedy would therefore need to address versioning, update synchronisation, and equivalence of input quality—administrative burdens far greater than those faced in earlier EFD cases. The Court has repeatedly cautioned, most recently in *Slovak Telekom*, that remedies

⁴⁷ Klaus Kowalski, Cristina Volpin, and Zsolt Zombor, European commission, Competition Policy Brief, “Competition in Generative AI and Virtual Worlds” (2024), p. 2

⁴⁸ Bertin Martens, Policy Brief “Catch-up with the US or prosper below the tech frontier? An EU artificial intelligence strategy”, (2024), source: <https://www.bruegel.org/policy-brief/catch-us-or-prosper-below-tech-frontier-eu-artificial-intelligence-strategy>

⁴⁹ Klaus Kowalski, Cristina Volpin, and Zsolt Zombor, European commission, Competition Policy Brief, “Competition in Generative AI and Virtual Worlds” (2024), p. 4-6

⁵⁰ Graef I., Tilburg University, TILEC Discussion Paper, “Rethinking the Essential Facilities Doctrine for the EU Digital Economy” (2019), Section III

⁵¹ OECD, ARTIFICIAL INTELLIGENCE PAPERS No. 18, OECD Publishing, “ARTIFICIAL INTELLIGENCE, DATA AND COMPETITION” (2024), p. 22

must not entail ongoing regulatory supervision or require authorities to manage the functioning of the facility⁵². With LLMs, however, ensuring meaningful access would *necessarily* involve precisely such continuous oversight.

A final problem with extending the essential facilities doctrine to LLMs concerns its fit with wider EU technological and industrial policy. Both the Commission's Policy Brief and recent OECD assessments underline that Europe remains behind the global leaders in the development of frontier foundation models. Imposing far-reaching access duties in this context could discourage precisely the types of investment—large-scale model training, high-performance computing infrastructure and access to high-quality datasets—in which the EU is already at a structural disadvantage. As Fazio (2022) argues, EU competition policy in the digital sphere must be designed to reinforce, rather than undermine, the Union's capacity to build competitive technological capabilities⁵³. Against this background, deploying the essential facilities doctrine for LLMs would not only stretch the case law but could also run counter to the EU's strategic objective of strengthening its position in advanced AI. The doctrine was developed for relatively static network infrastructures, not for fast-evolving general-purpose AI systems whose ongoing development is central to innovation across the digital economy.

3.2 Interaction with intellectual property rights: copyright, trade secrets, APIs

The interaction between intellectual property (IP) rights and the essential facilities doctrine has always constituted one of the most conceptually challenging dimensions of EU competition law. The Court of Justice has consistently treated compulsory access to IP-protected assets as an *exceptional* intervention into the rightholder's autonomy, beginning with *Magill* case and later refined in *IMS Health* and *Microsoft case*. These cases demonstrate that when an alleged essential facility is protected by copyright or related rights, the EFD is not simply applied through *Bronner's* strict indispensability test. Rather, it becomes subject to an additional layer of IP-specific criteria. Academic analyses converge on this point: the doctrine becomes significantly more restrictive once IP is involved.

According to the Court's ruling in *Magill* case, a refusal to grant a copyright license could only be considered abuse if it hindered the development of a "new product" that customers wanted. *IMS Health* upheld this provision, stating that mandatory licensing would only be acceptable in "rare circumstances". Also, according to Dacar,

⁵² CJEU, Case C-165/19 P, *Slovak Telekom v Commission*, Judgment of 25 March 2021, par. 38

⁵³ Emanuele Fazio, European Papers, 'Adapting Competition Law to the Digital Transition: Two Challenges' (2022), source: <https://www.europeanpapers.eu/europeanforum/adapting-competition-law-to-digital-transition>

IP-related EFD is already far more limited than its application to physical infrastructure due to these exceptional-circumstance constraints. These limitations are even more noticeable in digital marketplaces because the underlying assets are intangible and require a lot of creativity⁵⁴.

This rationale was applied to Microsoft software interfaces, with the General Court supporting mandatory access to interoperability information but refusing to mandate source code disclosure, emphasizing the importance of preserving incentives for innovation. Graef notes that Microsoft represents both the doctrinal adaptability and the limits of EFD in the IT sector: the Court notably protected the technology's core with IP rights while mandating access to only the fundamental information necessary for interoperability. In current conversations about AI APIs, it is vital to differentiate between "interface specifications" and "functional replication of the software." Graef shows that, even where competition concerns justify intervention, EU courts treat compulsory licensing of intellectual property as an exceptional and carefully circumscribed remedy, avoiding outcomes that would undermine the core exclusivity of the protected asset or allow unrestricted replication of the copyrighted material⁵⁵.

These precedents have direct implications for the LLM environment. Training datasets may include copyrighted works or sui generis database-protected materials. However, as Graef observes in the context of digital platforms and Big Data, even where data hold strategic value, competition law is reluctant to mandate access where doing so would undermine the rightholder's incentive to curate, organise, and maintain datasets⁵⁶. Dacar similarly argues that compulsory access to data, particularly where significant investment and know-how underlie its compilation, risks eroding the competitive process the doctrine intends to protect⁵⁷. Applying EFD to LLM training data would therefore have to overcome not only *Bronner's* indispensability threshold but also the *IMS Health* "new product" requirement focusing on innovation impacts.

Model weights reveal a more evident conflict. They form the core area of competitive distinction, safeguarded not by copyright but by trade secrets. As Ritter shows, EU competition law treats compulsory access to intellectual property as particularly intrusive, since it directly interferes with the substance of exclusivity and investment incentives. This logic applies with particular force to trade secrets, where

⁵⁴ Rok Dacar, article "The Essential Facilities Doctrine, Intellectual Property Rights, and Access to Big Data" (2023), p. 1494-1495, source: <https://link.springer.com/article/10.1007/s40319-023-01396-7>

⁵⁵ Inge Graef, TILEC, Cambridge Student Law Review, 'Tailoring the Essential Facilities Doctrine to the IT Sector: Compulsory Licensing of Intellectual Property Rights after Microsoft' (2011), p. 4-10

⁵⁶ Inge Graef, KU Leuven, "*Data as Essential Facility: Competition and Innovation on Online Platforms*" PhD Thesis (2016), p. 262-263

⁵⁷ Rok Dacar, article "The Essential Facilities Doctrine, Intellectual Property Rights, and Access to Big Data" (2023), p. 1494-1495, source: <https://link.springer.com/article/10.1007/s40319-023-01396-7>

disclosure irreversibly eliminates the protected value⁵⁸. Turney similarly supports this perspective, contending that incentives for innovation should steer the limits of EFD actions in markets under IP protection. In AI systems, where ongoing training, fine-tuning, and optimization are central to competition, mandatory access to model weights would undermine the dynamic efficiency that EU competition law aims to protect⁵⁹.

Moreover, APIs fall into a middle classification. Although API structures can be safeguarded by copyright, as the Court noted in *SAS Institute*, they serve as means for interoperability and access. Graef (2011) points out that API-based interoperability poses questions akin to those faced by Microsoft: when does access foster competition, and when does it permit parasitic replication? The prevailing academic opinion suggests that mandatory access should be limited to what is essential for compatibility, steering clear of solutions that enable rivals to reproduce the complete underlying system⁶⁰.

In all these aspects (copyrighted datasets, model weights protected as trade secrets and API interfaces), the academic discussion (Turney 2005; Ritter 2005; Graef 2011; Dacar 2023) and legal precedents point to a key finding: when the claimed essential facility involves an IP-sensitive resource, EU competition law establishes stricter standards to safeguard innovation incentives. Expanding EFD to encompass LLM-related inputs would signify a significant broadening of current doctrine, “breaking into” areas where courts have traditionally shown remarkable restraint.

4. The Digital Markets Act: A New Regulatory Approach

4.1 *Rationale for ex ante regulation of gatekeepers*

The Digital Markets Act (DMA) marks a decisive turn in the EU’s strategy for governing large digital platforms. Rather than relying exclusively on the traditional tools of EU competition law, the DMA introduces a set of obligations that apply in advance and are tailored to a limited group of “gatekeeper” firms. This change did not emerge in a vacuum: it reflects growing concerns that the structure of digital markets, combined with the limits of ex post enforcement, has allowed certain

⁵⁸ Cyril Ritter, SSRN ‘Refusal to Deal and “Essential Facilities”: Does Intellectual Property Require Special Deference Compared to Tangible Property?’ (2005), p. 9-10 source: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=726683

⁵⁹ James Turney, Pritzker School of Law, ‘Defining the Limits of the EU Essential Facilities Doctrine on Intellectual Property Rights: The Primacy of Securing Optimal Innovation’, 3 *Nw. J. Tech. & Intell. Prop.* (2005), p. 180, 184–186, 196–197

⁶⁰ Inge Graef, TILEC, Cambridge Student Law Review, ‘Tailoring the Essential Facilities Doctrine to the IT Sector: Compulsory Licensing of Intellectual Property Rights after Microsoft’ (2011), p. 6-7 & 18-19

platforms to acquire positions of influence that cannot be effectively checked by existing instruments.

4.1.1 Structural Features of digital markets

An essential element of the narrative starts with the characteristics inherent to digital markets. The analysis by Crémer, de Montjoye and Schweitzer continues to hold influence in this context. They highlight how network effects, data benefits and pronounced economies of scale inherently drive these markets toward concentration. Once a platform evolves into a center—be it in search, app distribution or social networking—it gains from self-strengthening processes that render it very challenging, for rivals to disrupt its dominance. The more users a platform attracts, the more data it gathers; and the more data it gathers, the more attractive it becomes to both advertisers and developers. This feedback loop means that competitive pressure alone is often insufficient to dislodge an entrenched platform⁶¹.

In this context, Ducci emphasizes the role of gatekeeper platforms as critical intermediaries and gateways. Platforms that constitute an important access point for business users can, through their rules, design choices and contractual practices, significantly influence the conditions under which other firms reach end users⁶². This is not simply a matter of market share but of structural dependency: rivals cannot meaningfully exist on many digital markets without relying on the infrastructure provided by these dominant actors. These features explain why the DMA is not merely another competition law instrument. It was conceived to address structural imbalances that allow gatekeepers to maintain and extend their influence regardless of whether they engage in conduct that would traditionally qualify as abusive under Article 102 TFEU.

4.1.2 Shortcomings of Ex Post Enforcement

The second basis for ex ante regulations stems from the real-world experience of applying EU competition law to dominant platforms. Instances, like Google Shopping and Google Android demonstrate how intricate data-heavy probes can span years. When a ruling is finally reached—and frequently postponed further by appeals—the market has often shifted, occasionally causing harm to rival firms.

Georgieva stresses that the temporal limitations of ex post competition enforcement are structural rather than accidental. Because antitrust intervention necessarily occurs after conduct has materialised and depends on time-consuming investigative

⁶¹ Crémer, J., de Montjoye, Y.-A., & Schweitzer, H., Humboldt Universität Zu Berlin, “*Competition Policy for the Digital Era*” (2019), p. 20-24 & 36-38

⁶² Ducci F., European University Institute, Sciences Po “*Gatekeepers and Platform Regulation, Is the EU moving in the right direction?*” (2021), p.5 & 7-12

procedures, competition law often struggles to respond swiftly to rapidly evolving forms of platform behaviour⁶³.

Another issue is that competition cases typically address individual practices in isolation, whereas the conduct of gatekeepers often spans multiple products and forms of behaviour across an ecosystem. As Ducci explains, this case-by-case, ex post focus risks leaving regulators in a reactive position, addressing discrete practices without adequately tackling the underlying structural features that enable them⁶⁴.

Scholars emphasize that the DMA's ex ante model is intended to address structural sources of harm in digital markets before they materialise. Obligations imposed in advance, such as prohibitions on self-preferencing, interoperability requirements, and restrictions on certain data practices, are designed to tackle recurring patterns of conduct that have proven difficult to address effectively through ex post competition enforcement⁶⁵. In this sense, the DMA complements, rather than supplants, EU competition law by providing a more suitable toolkit for markets that evolve too rapidly for traditional enforcement to keep pace (Georgieva 2021 and Crémer et al. 2023).

4.1.3 Fairness and Contestability as Regulatory Goals

The third element of the rationale concerns the policy emphasis on fairness and contestability which the DMA clearly prioritizes as goals. Crémer et al. conceptualize fairness as addressing structural imbalances in bargaining power between gatekeepers and business users or consumers. Such imbalances may manifest in ranking practices, access conditions, or opaque service rules - forms of conduct that may not always be readily addressed through traditional abuse-of-dominance frameworks, yet can nonetheless distort market outcomes.⁶⁶

On the other side, contestability concerns the ability of competitors to access and expand within markets controlled by digital intermediaries. Structural obstacles, such as data asymmetries, limited interoperability and user lock-in, can significantly hinder start-ups and smaller firms from innovating or establishing a foothold. This reasoning is echoed in broader economic analyses emphasising the role of ex ante frameworks in preventing incumbent platforms from entrenching their dominance⁶⁷.

⁶³ Georgieva, A. , European Papers, "The Digital Markets Act Proposal: Ex-Ante Regulation Infused with Competition Principles." (2021), p. 27-28

⁶⁴ Ducci F., European University Institute, Sciences Po "Gatekeepers and Platform Regulation, Is the EU moving in the right direction?", (2021), p. 9-12

⁶⁵ Crémer, J., Fletcher, A., Heidhues, P., Schnitzer, M., Scott Morton, F., et al. "Fairness and Contestability in the DMA." *Yale Journal on Regulation* (2023), p. 975-978

⁶⁶ Crémer, J., Fletcher, A., Heidhues, P., Schnitzer, M., Scott Morton, F., et al. "Fairness and Contestability in the DMA." *Yale Journal on Regulation* (2023), p. 981-989

⁶⁷ OECD, "Ex Ante Regulation and Competition in Digital Market" (2021), p. 9-11 & 18-20

By grounding its obligations in these two principles, the DMA adopts a broader conception of harm and a more holistic vision of market functioning than what is typically pursued through Article 102 TFEU. This shift reflects a growing consensus in academic literature that preserving fairness and contestability may require intervention before specific anti-competitive acts materialise (Crémer et al. 2023 and Georgieva 2021).

4.1.4 Gatekeepers as a Distinct Regulatory Category

The justification for the DMA is additionally reinforced by the establishment of the "gatekeeper" classification. Instead of applying duties to every large company, the DMA focuses on those with established intermediation dominance that enables them to dictate the regulations of whole ecosystems. The combination of criteria (involving user counts, market capitalization and service scope) alongside qualitative evaluations indicates worries, about proportionality and targeted enforcement.

The idea that certain digital services may effectively function as unavoidable points of access also echoes earlier debates on essential infrastructure. Graef (2019) argues that in the digital economy control over assets such as data, technical interfaces or ranking mechanisms can render them indispensable inputs, insofar as access to them may be essential for firms to compete or even participate in the market⁶⁸.

Thus, the gatekeeper concept aligns closely with academic arguments that some platforms act not merely as market participants but as systemic intermediaries requiring bespoke regulatory oversight (Graef, 2019 and Ducci, 2021).

4.1.5. Conclusion

In conclusion, the justification for ex ante regulation under the DMA rests on a widely shared understanding of digital market dynamics and the shortcomings of traditional competition enforcement. Structural features such as network effects, data advantages, and intermediation power create durable positions of dominance that ex post tools struggle to address in time. At the same time, the emphasis on fairness and contestability reflects a policy shift toward safeguarding the competitive process rather than remedying individual infringements after they occur. The introduction of a gatekeeper category further operationalises these insights by targeting regulatory obligations at the actors whose positions give rise to systemic risks. Taken together, these factors explain why the EU opted for a regulatory model that intervenes proactively to preserve competition in digital environments.

⁶⁸ Graef I., Tilburg University, TILEC Discussion Paper, "Rethinking the Essential Facilities Doctrine for the EU Digital Economy" (2019), p. 2-3 & 5-7

4.2 Core obligations under the DMA

The Digital Markets Act operationalises its objectives of fairness and contestability through a set of concrete obligations, particularly those contained in Article 6. These obligations focus on the structural mechanisms through which gatekeepers exercise orchestration power, notably by regulating data access and portability, interoperability, and restrictions on the cross-use of data, areas where traditional ex post competition law has proven limited in its ability to intervene effectively⁶⁹.

4.2.1 Data Access and Portability (Article 6 DMA)

Data access represents one of the competitive advantages for digital platforms. Early studies of the economy highlighted that platforms gain from a cumulative data buildup allowing them to enhance their offerings, customize ranking algorithms and create entry barriers (Cr mer, de Montjoye & Schweitzer 2019)⁷⁰. In this context the DMA establishes requirements to guarantee that business users and end-users have the ability to access and transfer the data they produce while using gatekeeper services. These responsibilities entail furnishing access to performance statistics, advertising data and live information concerning interactions, on the platform.

The rationale underlying these provisions builds on earlier discussions concerning the role of data as a key competitive input in digital markets. Graef (2019) argues that certain categories of data controlled by platforms may acquire an indispensable character, particularly where limited access prevents competitors from operating on an equal footing. Against this background, the DMA's rules on data access and portability can be understood as a regulatory response informed by the essential facilities framework, seeking to lower switching costs and mitigate structural disadvantages in order to foster effective competition⁷¹.

Recent scholarship has examined the scope of Articles 6(9) and 6(10) DMA in detail. Hey (2024) provides a clear analysis of the technical and structural conditions required for data portability to be effective, emphasising that portability extends beyond one-off data transfers and includes continuous and real-time access. This is particularly important for business users whose activities depend on rapid data feedback. The analysis highlights that data access obligations must be implemented

⁶⁹ Simone, C., Laudando, A., "Principles and obligations of the Digital Markets Act in regulating the economic power of gatekeepers: Positive, negative or trade-off effects?", *Electron Markets* 35, 42 (2025), p. 6-7, source: <https://link.springer.com/article/10.1007/s12525-025-00788-6>

⁷⁰ Cr mer, J., de Montjoye, Y.-A., & Schweitzer, H., Humboldt Universitat Zu Berlin, "Competition Policy for the Digital Era" (2019), p. 31-33

⁷¹ Graef I., Tilburg University, TILEC Discussion Paper, "Rethinking the Essential Facilities Doctrine for the EU Digital Economy" (2019), p. 2-3

in a manner that preserves their competitive value, rather than merely ensuring formal compliance⁷².

4.2.2 Interoperability and Constraints on Self-Preferencing

Interoperability plays a role in the DMA's responsibilities especially concerning messaging services, app stores and essential platform capabilities. The economic rationale for interoperability is based on the understanding that network effects can lock-in users within ecosystems, hindering the success of alternative providers. Crémer et al. (2023) argue that interoperability mandates can mitigate lock-in dynamics by enabling competitors to connect with established platform infrastructures, thereby reducing gatekeepers' structural advantages. They further note that interoperability may foster innovation at the edges of digital ecosystems, by allowing new services to develop on top of existing platforms without being constrained by gatekeepers' control over interfaces⁷³.

From another viewpoint, interoperability functions as a preventative measure aimed at counteracting the method by which gatekeepers could favor their own services. Although self-preferencing is a conduct targeted by Article 6(5), interoperability fulfills a wider systemic role: it reduces the gatekeepers capacity to employ technical barriers to advance its own products. As Simone (2025) explains, interoperability requirements are intended to ensure fair and non-discriminatory access conditions within platform ecosystems, thereby limiting gatekeepers' ability to shape competitive outcomes through control over technical interfaces⁷⁴.

Interoperability also has implications for how innovative opportunities are allocated within digital ecosystems. Hey (2024) argues that open interfaces and interoperability standards can enable innovation by complementors and business users, particularly in markets where effective competition depends on technical integration with dominant platforms. In this sense, interoperability is closely connected to the DMA's objective of enhancing contestability.⁷⁵

4.2.3 Restrictions on Combining Personal Data Across Services

A crucial element of the DMA's regulatory framework involves constraints on data merging. Article 5 par.2 supported by Article 6 par.2 enforces restrictions on

⁷² Hey, F., Ilmenau University of Technology, Institute of Economics "Data Interoperability and Portability in the Digital Markets Act." TU Ilmenau Discussion Paper No. 192 (2024), p. 9-10 & 22-23

⁷³ Crémer, J., Fletcher, A., Heidhues, P., Schnitzer, M., Scott Morton, F., et al. "Fairness and Contestability in the DMA." *Yale Journal on Regulation* (2023), p. 993-996

⁷⁴ Simone, C., Laudando, A., "Principles and obligations of the Digital Markets Act in regulating the economic power of gatekeepers: Positive, negative or trade-off effects?", *Electron Markets* 35, 42 (2025), p. 6-7, source: <https://link.springer.com/article/10.1007/s12525-025-00788-6>

⁷⁵ Hey, F., Ilmenau University of Technology, Institute of Economics "Data Interoperability and Portability in the Digital Markets Act." TU Ilmenau Discussion Paper No. 192 (2024), p. 14-18

gatekeepers capacity to merge personal data acquired from various core platform services or from external third-party services. Ribera Martínez (2025) provides a comprehensive doctrinal analysis of Article 5(2) DMA, arguing that it pursues a dual objective: safeguarding users' autonomy in line with data protection law while preventing gatekeepers from leveraging cross-service data to entrench their market power. She explains that combining personal data across services enables gatekeepers to unify information from areas such as search, social media and advertising in ways that rivals cannot replicate, thereby reinforcing their dominant position across multiple markets⁷⁶.

This duty also relates to concerns of equity. As Simone (2025) explains, restrictions on data merging prevent gatekeepers from exploiting personal data disclosed by users in one context to gain advantages in another. By limiting such cross-use of data, these rules reduce the risk that gatekeepers reinforce their position across interconnected services through personalisation or data-driven profiling⁷⁷.

Taken together, the DMA's fundamental duties concerning data accessibility, interoperability and data integration represent a reaction to the intrinsic characteristics of digital markets: concentration of data, network externalities and ecosystem entrenchment. These rules are based on a collection of scholarly analysis acknowledging both the competitive and ethical consequences of platform dominance, over data and interfaces (Crémer et al. 2023, Graef 2019, Hey 2024, Ribera Martínez 2025 and Simone 2025). By intervening at these structural levers, the DMA seeks to correct asymmetries that traditional competition law has found difficult to address ex post.

4.3 Relationship between EFD and DMA

The adoption of the Digital Markets Act marks a significant milestone in the development of EU competition regulation. This is most profound in how the DMA transforms the regulatory framework that has traditionally been governed, at least conceptually, by the Essential Facilities Doctrine. The EFD has historically functioned as the primary doctrinal tool for urging leading entities to offer access to essential resources. However, its efficacy in digital markets has come under growing scrutiny. This section explores whether the DMA should be viewed as a supplement to the EFD or as a replacement legislative action addressing its shortcomings. It examines how

⁷⁶ Ribera Martínez, M. , University Villanueva, "Article 5(2) DMA: The Prohibition on Processing, Combining and Cross-Using Personal Data across Core Platform Services." (2025), p. 2-3 & 8-10

⁷⁷ Simone, C., Laudando, A., "Principles and obligations of the Digital Markets Act in regulating the economic power of gatekeepers: Positive, negative or trade-off effects?", *Electron Markets* 35, 42 (2025), p. 6-7 & 10-11, source: <https://link.springer.com/article/10.1007/s12525-025-00788-6>

both frameworks define dominance, indispensability and access, as well as if ex ante obligations under the DMA effectively eliminate the necessity for EFD analysis in gatekeeper scenarios.

4.3.1 Limits of the Essential Facilities Doctrine in Digital Markets

The essential facilities doctrine emerged from a small set of competition cases concerning physical infrastructure (ports, telecom networks, delivery systems) that were impossible or economically irrational to duplicate. Its logic was clear: where a dominant firm controls a facility indispensable for rivals to compete, access may need to be granted on fair, reasonable and non-discriminatory terms. However, as several authors underscore, transferring this doctrine to digital markets is fraught with conceptual and evidentiary problems. Graef's extensive analysis shows that data, although often portrayed as a key bottleneck in digital competition, will rarely qualify as "essential" under the traditional indispensability standard, given its non-rivalrous nature, the possibility of obtaining comparable data through alternative means, and its heterogeneity in quality and scope⁷⁸. As a result, proving *indispensability* under the strict standards developed in *Bronner* remains notoriously difficult.

The Commission's impact assessment acknowledges that digital markets are characterised by structural bottlenecks that limit contestability, notably where large platforms act as unavoidable access points due to strong network effects, data-driven advantages and user lock-in. These bottlenecks do not stem from physical infrastructure but from ecosystem-level entry barriers and entrenched intermediation power, which traditional ex post competition enforcement has struggled to address effectively⁷⁹. In particular, modern bottlenecks often arise not from physical infrastructure but from *ecosystem entry barriers*, network effects, and unrivalled data aggregation. The EFD, by contrast, requires applicants to satisfy a demanding set of legal tests, including showing that duplication of the facility is impossible and that refusal to supply would eliminate all competition in a downstream market.

The EC's DMA Impact Assessment recognised that the EFD's high thresholds make Article 102 enforcement too slow and too narrow to address structural issues in digital markets. Even if a refusal-to-deal case eventually succeeds—often after a decade of litigation—the remedy arrives at a point when market structures have

⁷⁸ Inge Graef, KU Leuven, "*Data as Essential Facility: Competition and Innovation on Online Platforms*" PhD Thesis (2016), p. 262-268

⁷⁹ European Commission, "COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT REPORT Accompanying the document Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on contestable and fair markets in the digital sector (Digital Markets Act)" (2020), Section 2

already solidified, competitors have exited, and innovation incentives have been distorted.

The OECD's comparative study reinforces this view: because digital markets evolve rapidly and are prone to tipping, competition law enforcement based on demanding evidentiary standards and lengthy investigations often proves too slow to respond effectively. The report highlights that traditional ex post tools tend to address isolated instances of conduct and struggle to tackle systemic risks arising in complex digital ecosystems, where market power is derived from the integration of data, network effects and intermediation across multiple services⁸⁰.

4.3.2 Conceptual Divergence: Systemic Intermediation vs. Single Facility Control

A key difference between the DMA and the EFD lies in how each conceptualises *market power*. The EFD is grounded in a bilateral model: a dominant firm controls a facility > rivals seek access to it > the question is whether access must be granted. This model presumes a vertically structured relationship between an upstream monopolist and downstream competitors.

Gatekeeper platforms, however, do not fit neatly within this framework. As Ducci argues, modern digital platforms exercise a form of structural intermediation power: they operate as unavoidable gateways between business users and end users across multiple interconnected services. Their dominance is neither confined to a single facility nor derived from scarcity. Instead, it emerges from control over multi-sided ecosystems, default positions, and self-reinforcing data feedback loop⁸¹. Accordingly, the EFD's focus on *one specific input* does not capture the broad set of structural levers that gatekeepers can use to shape competitive outcomes.

The DMA embodies this conceptual shift. As P. Larouche and A. de Streel note, the, instead of asking whether a platform controls an essential facility in the strict *Bronner* sense, the DMA identifies gatekeepers based on sustained intermediation significance, entrenched position, and cross-platform reach. It accepts that control over interfaces, user attention, operating systems, data aggregation and default settings collectively generate structural power⁸². This reorientation indicates that the DMA is not merely a tool for mandating access, but a holistic governance framework tailored to the distinctive economic logic of digital platforms.

4.3.3 Procedural Incompatibility: Ex Post Litigation Versus Ex Ante Obligations

⁸⁰ OECD, "Ex Ante Regulation and Competition in Digital Market" (2021), section 2.1 & 2.2

⁸¹ Ducci F., European University Institute, Sciences Po "Gatekeepers and Platform Regulation, Is the EU moving in the right direction?" (2021), p. 7-12

⁸² A. de Streel & N. Larouche, "The European Digital Markets Act: A Revolution Grounded on Traditions," *Journal of European Competition Law & Practice* (2021) 12(7): p. 542–560

second major divergence concerns procedural design. The EFD operates as an ex post doctrine: access is mandated only after a finding of abuse, following lengthy investigations and detailed economic scrutiny. As Georgieva explains, competition law enforcement necessarily intervenes after the conduct has occurred and depends on time-consuming investigative procedures, making it inherently reactive and slow⁸³.

The DMA breaks sharply with this logic. Its obligations—on self-preferencing, data access, interoperability, and anti-tying—apply *automatically* once a platform is designated as a gatekeeper. No showing of indispensability, foreclosure, or consumer harm is required (criteria of EFD)⁸⁴. The rationale is that many harmful practices repeat across platform contexts, and waiting for ex post adjudication allows these practices to entrench dominance. Larouche and de Streel stress that the DMA effectively translates solutions to recurrent competition problems into predefined obligations, without requiring a case-by-case demonstration of harm⁸⁵.

This shift reflects a fundamental policy conclusion: the EFD’s litigation-centered model is procedurally incapable of addressing fast-moving digital markets. The DMA instead establishes a regulatory baseline that pre-empts the need for prolonged legal proceedings.

4.3.4 Complementarity or Substitution?

Whether the DMA substitutes the EFD or merely complements it, remains contested. Three perspectives can be identified:

(a) Substitutive Reading: The DMA as a Functional Replacement

Under this view, the DMA can be understood as a regulatory response to the limits of traditional ex post competition enforcement in digital markets. Rather than relying on case-by-case findings of abuse, the DMA introduces ex ante obligations aimed at addressing structural risks associated with entrenched platform intermediation. The Commission’s Impact Assessment explicitly recognises that existing tools, including refusal-to-supply enforcement, have proven insufficient to tackle the systemic and recurrent competition problems posed by large digital platforms⁸⁶. Several scholars

⁸³ Georgieva, A. , European Papers, “The Digital Markets Act Proposal: Ex-Ante Regulation Infused with Competition Principles.” (2021), p. 27-28

⁸⁴ DMA art. 5-7

⁸⁵ A. de Streel & N. Larouche, “The European Digital Markets Act: A Revolution Grounded on Traditions,” *Journal of European Competition Law & Practice* (2021) 12(7): p. 545–546

⁸⁶ European Commission, “COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT REPORT Accompanying the document Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on contestable and fair markets in the digital sector (Digital Markets Act)” (2020), par. 13-14 & 78-80

argue that the DMA is therefore a legislative substitute, enabling what the EFD was intended—but ultimately unable—to achieve in digital environments.

(b) Complementary Reading: The EFD Still Matters in Non-Gatekeeper Contexts

A second interpretation treats the DMA and competition law as complementary. The DMA applies only to designated gatekeepers providing core platform services, while competition law continues to govern markets and conduct that fall outside its scope. As the OECD notes, even under ex ante regulatory regimes, competition law retains an important “residual enforcement function” for markets and practices not covered by regulation⁸⁷. From this perspective, the DMA and EFD coexist, each occupying a distinct regulatory domain.

(c) Hybrid Reading: EFD as Normative Foundation, DMA as Operational Mechanism

A third, more nuanced view sees the DMA not as a rejection of essential facilities logic but as an evolution of its underlying rationale. Graef’s analysis of data as a potential essential facility shows that the core intuition of the EFD (namely that dominant control over key inputs may warrant intervention to preserve competition) remains relevant, even if the traditional legal tests are difficult to satisfy in digital markets⁸⁸. However, the strict Bronner criteria are ill-suited to data-driven markets. Under this interpretation, the DMA can be understood as translating long-standing competition law concerns, such as ensuring access, preventing foreclosure, and enabling competition, into a more workable regulatory framework. Larouche and de Streel characterise this shift as “a revolution grounded on traditions,” emphasising continuity of objectives rather than a complete doctrinal rupture⁸⁹.

4.3.5 Practical Consequences for Enforcement

In practical terms, the DMA’s ex ante obligations have displaced the EFD for most platform-access questions. For example:

- **Data access** no longer depends on proving indispensability; the DMA imposes structured access obligations on gatekeepers.
- **Interoperability** can be mandated without showing that the absence of interoperability eliminates competition.

⁸⁷ OECD, “Ex Ante Regulation and Competition in Digital Market” (2021), p. 23-25

⁸⁸ Inge Graef, KU Leuven, “Data as Essential Facility: Competition and Innovation on Online Platforms” PhD Thesis (2016), p. 248-250

⁸⁹ A. de Streel & N. Larouche, “The European Digital Markets Act: A Revolution Grounded on Traditions,” *Journal of European Competition Law & Practice* (2021) 12(7): p. 545–546

- **Self-preferencing bans** sidestep the complex foreclosure analysis associated with Article 102.

Pitofsky et al. in their analysis also emphasise that courts have historically been sceptical of expansive EFD applications because of concerns about chilling investment and undermining incentives to innovate⁹⁰. The DMA bypasses these concerns by grounding obligations not in judicial balancing but in legislative judgment about systemic risks.

Yet, the EFD retains a role. In markets outside the DMA's scope, or when platforms evade designation, Article 102 and EFD-inspired analysis continue to provide a legal framework for assessing refusals to supply, discriminatory access, and leveraging strategies. Furthermore, the EFD remains relevant in interpreting what the DMA means by "fair and non-discriminatory conditions," serving as a background doctrinal reference point.

4.3.6 Conclusion

The connection between the Essential Facilities Doctrine and the Digital Markets Act features elements of both continuity and change. The DMA clearly emerged from the acknowledgment of the EFD's shortcomings in digital markets—especially its strict legal criteria, evidential requirements, and long procedural processes. In this regard and from a point of view, it acts as a replacement legislative instrument for gatekeeper situations. The DMA also indicates a wider development of the EFD's foundational principles: the dedication to preventing monopolistic control of essential resources continues, even though now adjusted in a way to apply accordingly to data-centric, multi-sided platforms.

Beyond the DMA's limits, the essential facilities doctrine remains in effect as a supporting, supplemental mechanism. However, within the key platform services regulated by the DMA, EFD enforcement is effectively replaced by a more adaptable, proactive framework of ex ante obligations. The outcome is a blended framework where conventional competition law and industry-specific regulations exist together, each tackling various aspects of unfair digital market dominance.

5. The EU's Digital Competition Strategy in Global Context

5.1 Comparison with *United States*

The European Union and the United States are the leaders in competition law within the digital economy, but their regulatory approaches, institutional frameworks, and enforcement methods differ greatly. The difference is particularly evident in how

⁹⁰ Robert Pitofsky, Donna Patterson and Jonathan Hooks, 'The Essential Facilities Doctrine under US Antitrust Law' (2002) 70 *Antitrust Law Journal*, p. 443-444

they tackle Big Tech, focusing on issues such as market influence, dominance abuse, platform ecosystems, and the necessity for proactive regulation. Even though recent advancements in the United States indicate some similarities, the core differences between the two systems still persist significantly.

A key differentiating factor concerns the design of institutions and the framework of enforcement. As per Gupta, the EU functions through a centralized administrative enforcement structure in which the European Commission carries out investigations, delivers infringement decisions, and applies remedies, whereas in the United States, there exists an adversarial judicial system where the DOJ or FTC needs to convince courts of anti-competitive conduct before sanctions can be applied⁹¹.

This structural difference affects the nature of enforcement. In the EU, antitrust enforcement is organised around an administrative model in which the Commission investigates and adopts infringement decisions, subject to subsequent judicial review, whereas U.S. enforcement is more adversarial and court-centred. As Rogers explains, the EU approach is more interventionist, reflecting a belief that government action can improve market outcomes, while U.S. antitrust has traditionally exhibited a stronger “inherent trust in a market-based economy” and a reluctance to intervene without convincing evidence of consumer harm⁹².

A second essential difference relates to legal criteria and enforcement focus. EU competition law, especially according to Article 102 TFEU, places a “particular obligation” on dominant companies to ensure that competition remains undistorted. Rogers highlights that the EU is increasingly prepared to act against dominant platforms even when competitive damage isn't evident through pricing effects, and the Union is more concerned about false negatives, where anti-competitive behavior is overlooked, than false positives⁹³. In contrast, Section 2 of the Sherman Act in the United States mandates evidence of exclusionary behavior and typically requires stringent proof of damage to the consumer welfare criterion, generally assessed via price, output, or innovation impacts⁹⁴. Monti likewise shows that EU competition law adopts a broader understanding of its objectives, extending beyond narrow consumer welfare to include the protection of market structure and the competitive

⁹¹ Pranjali Gupta, Cambridge University, Science and Policy Exchange, ‘Competition Policy in the Age of “Big Tech”: Assessing the EU’s Approach’ *Cambridge Journal of Science and Policy* (2020), p. 4

⁹² C Paul Rogers III, ‘Competition Law and the EU and US Approaches to Dominant Markets: Will the Gap Narrow?’ (2022) *SMU Dedman School of Law*, p. 1-3

⁹³ C Paul Rogers III, ‘Competition Law and the EU and US Approaches to Dominant Markets: Will the Gap Narrow?’ (2022) *SMU Dedman School of Law*, p. 2-3 & 6-7

⁹⁴ The Sherman Act (1890), Section 2

process, whereas U.S. antitrust remains comparatively more restrictive, prioritising effects-based analyses grounded in economics and efficiency⁹⁵.

The difference is particularly pronounced in the enforcement of Big Tech. Gupta details how the EU has spearheaded worldwide efforts against GAFA (Google, Amazon, Facebook, Apple), targeting Google in various prominent cases (Shopping, Android, AdSense) and utilizing a broad interpretation of dominance abuse that may encompass behavior in adjacent markets, leveraging, and instances of self-preferencing⁹⁶. In these situations, the Commission has viewed digital ecosystems not merely as separate markets but as interconnected frameworks where dominance over one element (e.g., search, mobile operating systems) can skew competition in other areas. In contrast, the United States has historically viewed Google's behavior more favorably: Rogers observes that although the EU levied unprecedented fines, the FTC determined as recently as 2013 that Google's search methods were advantageous for consumers, ending its inquiry without significant structural changes⁹⁷. It was not until 2020 that U.S. enforcement significantly intensified when the DOJ initiated a monopolization lawsuit against Google, followed by several States that filed their own lawsuits addressing Google's actions in advertising markets, as Monti points out⁹⁸.

Monti's detailed comparative analysis reinforces this pattern. When comparing the U.S. DOJ's 2020 Google case with the Commission's Android decision, he finds that although the underlying intuitions about market power are similar, the U.S. framing is typically more elaborate in defining relevant markets and articulating theories of harm. He explains that this reflects the demands of a litigation-based system, whereas the Commission's administrative procedure permits earlier intervention grounded in prospective risks and structural concerns⁹⁹. Nonetheless, he also highlights that U.S. antitrust remains more cautious than the EU in pursuing theories such as self-preferencing or margin squeeze, reflecting deeper jurisprudential hesitancy within American courts.

A further divergence arises from regulatory philosophy: ex-ante vs. ex-post. This is where the EU has taken a decisive turn. Skara and colleagues emphasize that the limitations of traditional competition law, including long investigation timelines and

⁹⁵ Giorgio Monti, 'Taming Digital Monopolies: A Comparative Account of the Evolution of Antitrust and Regulation in the European Union and the United States' (2022), p. 44-45 & 48-50

⁹⁶ Pranjali Gupta, Cambridge University, Science and Policy Exchange, 'Competition Policy in the Age of "Big Tech": Assessing the EU's Approach' *Cambridge Journal of Science and Policy* (2020), p. 5

⁹⁷ C Paul Rogers III, 'Competition Law and the EU and US Approaches to Dominant Markets: Will the Gap Narrow?' (2022) *SMU Dedman School of Law*, p. 6-8

⁹⁸ Giorgio Monti, 'Taming Digital Monopolies: A Comparative Account of the Evolution of Antitrust and Regulation in the European Union and the United States' (2022), p. 51-52

⁹⁹ Giorgio Monti, 'Taming Digital Monopolies: A Comparative Account of the Evolution of Antitrust and Regulation in the European Union and the United States' (2022), p. 52-55

the inability of ex-post enforcement to restore competition in markets characterized by network effects, data advantages, and gatekeeping functions, motivated the adoption of the Digital Markets Act (DMA)¹⁰⁰. The DMA stands on a regulatory regime applicable to presumed (on certain criteria) “gatekeepers,” imposing obligations and prohibitions independent of proven infringement. This reflects the EU’s belief that structural features of digital markets (lock-in effects, dependence, and conglomerate ecosystems) require systemic and proactive intervention. Gupta similarly notes that EU authorities have come to view financial fines as an insufficient deterrent for firms whose global turnover dwarfs the penalties imposed, a perception that has contributed to the turn toward ex ante rules as a more effective means of promoting contestability and fairness in digital markets¹⁰¹.

The United States has not adopted an equivalent ex-ante regulatory regime. Monti shows that while a range of congressional bills—, uch as the American Innovation and Choice Online Act and the Open App Markets Act, have been proposed, none have been enacted at the federal level, with U.S. oversight continuing to rely predominantly on traditional antitrust law. He attributes this legislative inertia to institutional fragmentation and political polarization, alongside longstanding skepticism toward sector-specific regulation¹⁰².

Both Monti and the earlier Crémer et al. reports highlight another important distinction: the EU’s greater willingness to interpret market power in functional and ecosystemic terms, rather than through strict price-based metrics or narrow definitions of markets. The Crémer Report underscored that digital markets tend toward concentration, that market power becomes “sticky,” and that entry barriers make it difficult for rivals to compete on merit—conclusions aligned with the Commission’s move toward the DMA. The United States, by contrast, has traditionally insisted on more narrowly delineated markets and higher evidentiary thresholds before intervening¹⁰³.

Despite of these differences, Monti recognizes an emerging alignment. The DOJ and FTC have indicated a greater readiness to confront established digital platforms, demonstrating a wider change in American antitrust research and policy discussion. Nevertheless, in the absence of a federal ex-ante framework, U.S. enforcement

¹⁰⁰ Skara, Gentjan, Oriona Muçollari and Bojana Hajdini, “Adapting the Competition Policy for the Digital Age: Assessing the EU’s Approach”. *Laws* 13: 64. (2024), p. 3-6, source: <https://doi.org/10.3390/laws13050064>

¹⁰¹ Pranjali Gupta, Cambridge University, Science and Policy Exchange, ‘Competition Policy in the Age of “Big Tech”: Assessing the EU’s Approach’ *Cambridge Journal of Science and Policy* (2020), p. 6

¹⁰² Giorgio Monti, ‘Taming Digital Monopolies: A Comparative Account of the Evolution of Antitrust and Regulation in the European Union and the United States’ (2022), p. 56-58

¹⁰³ Crémer, J., de Montjoye, Y.-A., & Schweitzer, H., Humboldt Universität Zu Berlin, “*Competition Policy for the Digital Era*” (2019), p. 20-27

continues to be reactive and driven by litigation, while the EU currently implements both a competition law system and an ex-ante regulatory system.

Overall, from a personal view, the available literature indicates that both the United States and the European Union express increasing worries regarding digital market dominance, yet their institutional frameworks prompt them to pursue distinct regulatory approaches. I believe the EU's hybrid approach, that integrates conventional competition law with proactive structural requirements, is better equipped to tackle the rapidity and extent to which digital platforms influence markets, as well as to ensure fairness in the process for all actors. The U.S. might progressively align with the EU on key issues, but without Congress implementing a similar regulatory framework, enforcement disparities are expected to remain, strengthening the EU's position as the international standard-setter in digital competition regulation.

5.2 Comparison with China

The European Union and China embrace two sharply contrasting visions of how the digital sphere should be organised, governed, and controlled. Although both jurisdictions act assertively toward large technology firms and increasingly consider digital regulation as central to economic and geopolitical strategy, they do so from fundamentally different starting points. The EU's digital order is anchored in fundamental rights, legal constraints, and market fairness, whereas China's model is shaped by the political authority of the Party-state, national security imperatives, and the strategic use of platforms within a broader apparatus of state power.

One of the clearest illustrations of China's distinctive approach emerges from Creemers' analysis of the Social Credit System. Rather than a single unified programme, the system represents an evolving cluster of measures that tie together digital monitoring, administrative penalties, and incentives for compliance. It reflects an attempt to weave state supervision directly into social and economic life through data integration and algorithmic tools, enlarging the government's capacity to steer conduct¹⁰⁴. This logic, where platforms and data infrastructures reinforce state authority, sets China apart from the EU's fundamentally liberal constitutionalism.

The contrast becomes even more pronounced when examining how each side frames "digital sovereignty." Chan and Li highlight that the EU generally treats sovereignty as the ability to uphold its regulatory standards, safeguard personal data, and ensure that fundamental rights apply online. China, by contrast, speaks of sovereignty in territorial and political terms: cyberspace is viewed as a domain that

¹⁰⁴ Rogier Creemers, University of Leiden, 'China's Social Credit System: An Evolving Practice of Control', SSRN Working Paper (2018), p. 3-9

must fall under national jurisdiction, protected from foreign influence and external disruption¹⁰⁵. This leads to a regulatory system centred on strict geographic boundaries, data localisation, and direct state oversight of digital infrastructure—an outlook largely absent in the European debate.

China's recent moves in platform governance provide another illustration of its distinctive state-led digital order. The 2021 Anti-Monopoly Guidelines for the Platform Economy, together with high-profile enforcement actions against major platforms such as Alibaba and Tencent, were not limited to narrow price-based competition concerns. Instead, they formed part of a broader effort to restore market order, curb disorderly expansion, and align platform activity with wider economic and regulatory objectives, signalling that large digital firms ultimately remain subordinate to national priorities¹⁰⁶. Musoni and colleagues describe China's approach as a state-centred and security-driven model of digital sovereignty, in which regulation is used to entrench state control, surveillance capacities, and industrial policy objectives¹⁰⁷. Taken together, these actions blur the line between competition law, administrative regulation, and political oversight.

Data governance reinforces this pattern. Su's overview of the Cybersecurity Law, Data Security Law, and Personal Information Protection Law shows that, although these statutes contain elements that resemble global data-regulation standards, they remain grounded in national security and Party oversight. Cross-border data transfers, data audits, and localisation requirements are tightly regulated, ensuring that the state maintains ultimate authority over digital flows¹⁰⁸. In contrast, the EU's GDPR is built around individual rights, consent, and procedural guarantees. Su notes that this divergence has produced two very different global models: the EU's rights-oriented "Brussels effect" and China's more state-centred "Beijing effect".

In the realm of platform competition, the differences between the EU and China become even more tangible. Wang's comparative study of platform "banning behaviour" shows that both jurisdictions attempt to limit exclusionary conduct, but

¹⁰⁵ Chin, Yik Chan and Li, Ke, "Sovereignty in Cyberspace: EU and China Compared", Paper presented at the 2021 Annual GigaNet Symposium (virtual), (2021), p. 1-5 & 7-8, source: <https://www.giganet.org/2021SymposiumPapers/YikChin%20Chan%20%26%20Ke%20Li%202021.pdf>

¹⁰⁶ WEI HUANG, WENDY ZHOU, XIUMIN RUAN & XI ZHANG, "ANTITRUST GUIDELINES FOR THE PLATFORM ECONOMY IN THE ERA OF ENHANCED ANTITRUST SCRUTINY" (2021), p. 3-4 & 7-8, source: <https://www.competitionpolicyinternational.com/wp-content/uploads/2021/03/10-Antitrust-Guidelines-for-the-Platform-Economy-in-the-Era-of-Enhanced-Antitrust-Scrutiny-By-Wei-Huang-Wendy-Zhou-Xiumin-Ruan-Xi-Zhang.pdf>

¹⁰⁷ Melody Musoni, Poorva Karkare, Chloe Teevan and Ennatu Domingo, "Global Approaches to Digital Sovereignty: Competing Definitions, Contrasting Policy Approaches" ECDPM Discussion Paper 344, (2023), p. 1-3 & 15-16

¹⁰⁸ Ruoxin Su, Dechun Zhang, 'Adaptive Sovereignty: China's Evolving Legislative Framework for Transnational Data Governance' (2025), p. 2-5

the mechanisms differ sharply. The EU relies on a legalistic, ex-ante approach through the DMA, aiming to ensure contestability and structural fairness. China, however, uses a mix of administrative orders, administrative enforcement and sectoral regulation, reflecting a governance environment in which platform conduct is closely shaped by regulatory priorities and public policy objectives defined by the state. In Europe, by contrast, platforms confront detailed legal obligations enforced through a rights-based and judicially reviewable process¹⁰⁹.

European policy analyses demonstrate a keen understanding of these discrepancies. Ditfurth outlines the EU's digital sovereignty strategy as a calculated approach situated between American and Chinese frameworks, aiming to protect individual rights and lessen reliance on external technologies¹¹⁰. The IE Center for the Governance of Change presents this situation as a rivalry among three regulatory models: the US's corporate-centric system, China's authoritarian digital governance, and the EU's rights-focused structure¹¹¹. This perspective emphasizes that Europe's approach is influenced not only by internal factors but also by its middle ground between two technological giants with regulatory ideologies that markedly differ from its own.

Aifang Ma's analysis enhances this view by outlining three unique organizing principles: security and political order in China, citizens' rights in the EU, and market freedoms in the US. For China, digital regulation is inherently connected to preserving political stability, protecting national security, and guaranteeing that digital resources align with state goals. In Europe, regulation is presented as a protection for democratic principles and market equity¹¹². These structural variations clarify why a meaningful comparison between the EU and China cannot be made just by looking at specific laws. The more significant gap resides in political frameworks, regulatory philosophies, and the ethical bases of governance.

When viewed collectively, these sources indicate that the EU and China function with nearly contradictory beliefs regarding the connection between the state, the market, and digital infrastructures. China's approach is built around state primacy, administrative intervention, and the idea that digital technologies must ultimately serve national political goals. The EU, despite its increasingly assertive regulatory

¹⁰⁹ Hechen Wang, China University of Political Science and Law, 'Competition Law Response to Platform's Banning Behavior: Rethinking EU and China's Solution' (2024) SSRN Working Paper, p 17-18 & 21-24

¹¹⁰ Lukas von Ditzfurth, JIPITEC, "The European Union's Pursuit of Digital Sovereignty Through Legislation" (2025), p.1-3 & 8-9

¹¹¹ IE Center for the Governance of Change, *Reclaiming Digital Sovereignty: The EU's Role in the Geopolitics of Digital Governance* (2025), p. 1-3 & 5-9

¹¹² Aifang Ma, "Digital legislation: convergence or divergence of models? A comparative look at the European Union, China and the United States" (2024)

posture, insists on judicial oversight, transparency, individual rights, and rules that bind public authorities as much as private actors.

From a personal point of view, the EU–China comparison makes clear that digital sovereignty is not a single concept but an arena where political values are expressed and contested. The EU treats sovereignty as the autonomy to regulate in line with democratic principles, whereas China sees it as the authority to secure and steer digital infrastructures for state purposes. Understanding this divide is essential for anticipating how digital governance, as well as global competition over it, will evolve in the future.

5.3 Analysis of the EU's approach to digital autonomy through law

- i) Digital strategy documents (e.g., *Shaping Europe's Digital Future*, *Digital Decade 2030*)

The European Union's idea of digital independence is distinctive in terms of its framework and its resources. Rather than pursuing control over digital technologies through direct government intervention or ownership, the EU has opted to achieve autonomy primarily via legal and regulatory approaches. This choice reflects the constitutional values of the Union, its commitment to fundamental rights, and its reliance on law as the main method for balancing power among Member States. As a result, digital autonomy within the EU context is closely connected to regulatory power, institutional oversight, and compliance with the rule of law.

This method is explicitly detailed in the European Commission's strategy *Shaping Europe's Digital Future* (2020), which positions digital transformation as a process that should be directed by European values. The document highlights that technological advancement must not progress separately from democratic values, competitive regulations, or essential rights. Importantly, digital autonomy is depicted not as technological seclusion or complete self-sufficiency, but as the Union's power to establish the regulations that govern digital markets and technologies¹¹³. Regulation is therefore seen as a strategic instrument that enables the EU to influence digital advancements while staying receptive to international trade and innovation.

Meanwhile, the Digital Decade Policy Programme 2030 enhances this vision by converting broad strategic objectives into precise targets and governance structures. It identifies digital capabilities, infrastructure, business transformation, and digital public services as crucial elements for improving Europe's digital status. Rather than advocating for political control over digital firms, the Programme focuses on reducing

¹¹³ European Commission, *Shaping Europe's Digital Future* (2020), p. 2-3 & 6

strategic dependencies, enhancing regulatory cooperation, and ensuring effective enforcement across the internal market¹¹⁴. Law acts as a unifying structure for Member States while also guiding private organizations toward shared public objectives.

Scholarly examination provides further insight into how this model operates in practical situations. Bradford's concept of the "Brussels Effect" demonstrates how the EU upholds digital autonomy beyond its borders. The Union can globalize its regulatory standards by requiring compliance with EU regulations for access to its extensive internal market. This framework allows the EU to influence the activities of global tech firms without relying on external measures or political power, enhancing sovereignty through legal norms rather than through forceful means¹¹⁵. Therefore, motivation is the key, and not coercion.

Floridi enriches this clarification by identifying European digital sovereignty as a "form of normative governance". In his evaluation, the EU's strength lies in incorporating ethical standards, accountability, and the protection of rights within the management of digital technologies¹¹⁶. Seen from this perspective, legal restrictions are not obstacles to autonomy but essential components of it. Sovereignty is exhibited through institutions that are transparent, answerable to democracy, and subject to judicial review.

ii) Digital sovereignty as a policy objective (own view)

Together, these references suggest that the EU's digital independence is mainly characterized as regulatory and constitutional. I believe this illustrates a thoughtful strategic position between the U.S. model that prioritizes the market and China's government-driven approach. While the EU's reliance on legal frameworks may limit its agility and responsiveness, it provides legitimacy, enduring sustainability, and global influence, allowing the Union to operate not as a digital superpower, but as a significant rule-maker in the international digital landscape.

6. Competition Law as a Tool for Digital Sovereignty

¹¹⁴ Regulation (EU) 2022/2484 establishing the *Digital Decade Policy Programme 2030* (2022) Articles 1–2, 4–9, Annex

¹¹⁵ Anu Bradford, *The Brussels Effect*, Northwestern University Law Review, Vol. 107 (2012), p. 3–7, 10

¹¹⁶ Floridi, L. , "Soft Ethics and the Governance of the Digital", *Philos. Technol.* 31, 1–8 (2018), source: <https://doi.org/10.1007/s13347-018-0303-9>

6.1 Discussion on whether existing and new competition tools can reduce EU dependence on foreign digital infrastructures

Debates on digital sovereignty in the European Union start from the observation that key layers of the digital ecosystem are controlled by a small number of predominantly US-based firms. Platforms such as Meta, Apple, Alphabet, Amazon and Microsoft are frequently characterised as exercising a form of “de facto sovereignty”, insofar as they control critical digital infrastructures and impose private rules that structure online interactions. Their infrastructural and rule-setting power enables them to shape economic and social behaviour in ways that may conflict with European regulatory priorities, fuelling concerns about the Union’s autonomy, competitiveness and long-term security in the digital sphere¹¹⁷. Against this backdrop, the question arises whether competition law—both in its traditional and newly developed forms—can serve as an effective instrument to reduce such structural dependence.

Scholarly analyses of competition policy in digital markets emphasise both the scale of platform power and the limitations of ex-post antitrust enforcement. Nicoli and Iosifidis describe major digital platforms as “internet gatekeepers” whose dominance is sustained by network effects, cross-market integration and technological design choices that entrench user lock-in. They show that where competition policy intervention is weak or delayed, digital markets tend to exhibit high concentration levels and persistent barriers to entry, resulting in long-term dependency of users and business partners. At the same time, they underline that traditional competition law remains primarily focused on economic and consumer welfare, while broader political and societal implications of platform dominance are typically addressed through separate regulatory instruments¹¹⁸. This suggests that Articles 101 and 102 of TFEU, while capable of addressing specific instances of abuse, are poorly equipped to dismantle the deeper structural dependencies generated by platform ecosystems.

The Commission-mandated report *Competition Policy for the Digital Era* reinforces this assessment by explicitly questioning whether existing competition tools are sufficient for data-driven, platform-based markets. The report highlights how economies of scale, access to data, and entrenched network effects can lead to market tipping and durable dominance, calling for an evolution in competition policy approaches¹¹⁹. Read together with the analysis by Nicoli and Iosifidis, the report

¹¹⁷ IE Center for the Governance of Change, *Reclaiming Digital Sovereignty: The EU’s Role in the Geopolitics of Digital Governance* (2025), p. 2-5

¹¹⁸ Nicoli, N. & Iosifidis, P., “EU digital economy competition policy: From ex-post to ex-ante. The case of Alphabet, Amazon, Apple, and Meta”, *Global Media and China*, (2023), 8(1), p. 24-38, source: doi: 10.1177/20594364231152673, p. 5-8

¹¹⁹ Cr  mer, J., de Montjoye, Y.-A., & Schweitzer, H., Humboldt Universitat Zu Berlin, “*Competition Policy for the Digital Era*”, 2019, p. 20-27 & 31-35

implies that conventional antitrust enforcement alone is unlikely to reverse Europe's reliance on a small set of non-European digital infrastructures.

The introduction of ex-ante regulation partially alters this dynamic. Guidi's examination of the Digital Markets Act (DMA) shows that the EU has deliberately created a distinct regulatory framework for gatekeepers understood as unavoidable intermediaries between business users and end users. Gatekeepers are identified by characteristics such as scale, multi-sidedness, limited multi-homing and strong data advantages. Many of the DMA's obligations target the control of information and data by such firms, including requirements on interoperability, data portability and limits on self-preferencing¹²⁰. The underlying rationale is that reducing control over information flows and switching costs can strengthen contestability and weaken asymmetric dependency, even where the gatekeeper itself remains a foreign undertaking.

Nicoli and Iosifidis place the DMA within a broader shift from ex-post enforcement to ex-ante governance in EU competition policy. They observe that a series of expert reports and policy initiatives have converged on the conclusion that structural features of digital markets require preventive intervention rather than case-by-case sanctioning¹²¹. In this sense, new competition-adjacent tools do not eliminate dependence on foreign infrastructures but seek to rebalance power within existing market structures.

A similar conclusion emerges at the infrastructural level from Blancato's analysis of cloud computing. He shows that the EU increasingly frames cloud services as an area of "strategic dependency" and explores ways to reverse this dependency through regulatory, industrial and standard-setting measures¹²². Competition law, in this context, functions as one component within a wider policy toolkit rather than as a standalone solution.

Taken together, these sources suggest that competition law can mitigate, but not fully resolve, Europe's dependence on foreign digital infrastructures. Traditional antitrust remains necessary to discipline abuses, while ex-ante regimes such as the DMA can weaken structural lock-in and information control. However, neither approach fundamentally alters ownership or control of core infrastructures. Their primary contribution lies in rebalancing power relations and embedding dominant

¹²⁰ Sara Guidi, *European Papers*, Vol. 8, 2023, No 2, *European Forum, Highlight* of 26 July 2023, p. 405-410

¹²¹ Nicoli, N. & Iosifidis, P., "EU digital economy competition policy: From ex-post to ex-ante. The case of Alphabet, Amazon, Apple, and Meta", *Global Media and China* (2023), 8(1), pp. 24-38, source: doi: 10.1177/20594364231152673, p. 7-10

¹²² Blancato, F. G., "The cloud sovereignty nexus: How the European Union seeks to reverse strategic dependencies in its digital ecosystem" *Policy & Internet* (2023), 16, 12-32, source: <https://doi.org/10.1002/poi3.358>, p. 2-3

digital actors within a European legal framework grounded in contestability, fairness and public oversight.

6.2 Strategic role of certain regulatory attempts

The EU's attempt to address its growing exposure to dominant digital platforms has not taken the form of a single, clearly bounded legal strategy. Instead, it has emerged gradually through the interaction of competition law doctrines and newer regulatory instruments, each responding to different dimensions of platform power. All of these tools aim to improve access to digital markets, preserve conditions for competition, and limit the extent to which control over infrastructure translates into long-term dependency.

i) EFD in promoting market access

From a competition-law perspective, the essential facilities doctrine offers a starting point for understanding how access to critical inputs may be enforced. As Graef highlights, although the essential facilities doctrine developed in the context of traditional infrastructure such as ports or networks, its underlying logic may be extended to digital markets where certain platforms, interfaces or datasets function as unavoidable gateways. In such settings, refusal to grant access can risk foreclosing competition, particularly where network effects and economies of scale render duplication economically unrealistic¹²³.

Yet Graef is equally clear about the limits of this approach. The doctrine remains tightly circumscribed by demanding legal conditions, notably the requirement that the facility be truly indispensable and that denial of access would eliminate all competition on the downstream market. These thresholds reflect long-standing judicial concerns about deterring innovation and unduly interfering with firms' commercial freedom. As a result, while the essential facilities doctrine can operate as a corrective mechanism in extreme cases, it does not offer a general solution to the structural dependency characteristic of many digital markets.

This conclusion is further emphasized when the doctrine is utilized with data. Pošćić observes that data may, under specific conditions, satisfy the criteria of the essential facilities doctrine, particularly where rivals are unable to duplicate it within a reasonable time frame. Nonetheless, she emphasizes the conceptual challenges present, such as issues of substitutability, investment incentives, and the evolving landscape of data-centric competition¹²⁴. Consequently, the essential facilities

¹²³ Graef I., Tilburg University, TILEC Discussion Paper, "Rethinking the Essential Facilities Doctrine for the EU Digital Economy" (2019), p. 3-5 & 7-13

¹²⁴ Pošćić A., Martinovic A., "The Interplay Between the Essential Facility Doctrine and the Digital Markets Act: Implications to Big Data", *Acta Universitatis Carolinae – Iuridica* 2 (2023), p. 74–77

doctrine is largely reactive and atypical, adept at tackling particular exclusionary behaviors but inadequately equipped to transform markets controlled by a few dominant intermediaries

ii) DMA in ensuring contestability

The limitations of this case-by-case logic help explain the emergence of the Digital Markets Act. Rather than relying on proof of abusive behaviour, the DMA is built around the identification of gatekeepers whose structural position allows them to control access to digital markets. Hoffmann identifies contestability as a central objective of the regime, closely linked to the prevention of entrenched and durable gatekeeper positions. The DMA's obligations, particularly those addressing self-preferencing, interoperability and switching, are therefore designed to weaken the mechanisms through which gatekeepers entrench their position over time¹²⁵.

An important difference from competition law lies in the **ex ante regulatory nature** of these obligations. As Pošćić observes, access-related duties that would be difficult or impossible to impose through the essential facilities doctrine are incorporated directly into the regulatory framework. In this sense, the DMA does not replace competition law but supplements it, transforming access and contestability from exceptional remedies into ongoing regulatory expectations. While the DMA does not displace dominant firms from the market, it aims to reduce dependency by limiting their capacity to leverage infrastructural control into irreversible market power¹²⁶.

iii) Data Act and AI Act as complementary legislative tools

Alongside platform regulation, the EU has also turned to horizontal digital legislation to address structural imbalances more broadly. The European Parliament study on data sharing situates the Data Act within this context, emphasising its role in correcting asymmetric access to non-personal data. By granting users rights to access and share data generated by connected devices and by constraining unfair B2B contractual terms, the Act aims to lower entry barriers in data-intensive markets and reduce dependence on dominant data holders¹²⁷.

¹²⁵ Hoffmann, *Fairness in the Digital Markets Act*, European Papers 8(1) (2023), p. 19–22

¹²⁶ Pošćić A., Martinović A., *"The Interplay Between the Essential Facility Doctrine and the Digital Markets Act: Implications to Big Data"*, Acta Universitatis Carolinae – Iuridica 2 (2023), p. 78–84

¹²⁷ European Parliament, *"IPR and the Use of Open Data and Data Sharing Initiatives by Public and Private Actors"* (Study, May 2022), p. 10-11 & 112-113

The AI Act complements these instruments from a different angle. Pirozzoli describes it as establishing a risk-based governance framework aimed at ensuring that AI systems placed on the EU market comply with fundamental rights and democratic values. Although the Act is not framed in competition-law terms, it imposes binding constraints on the deployment of high-risk AI systems, many of which are developed and operated by large digital firms¹²⁸. In doing so, it reinforces the EU's ability to shape the operation of digital infrastructures according to its regulatory priorities rather than external norms.

When taken as a whole, these tools (EFD, DMA, DATA and AI ACT) show how the EU is using legislative architecture more and more to shape digital market structures. They mitigate the possibility of unilateral control, make access easier, and incorporate digital activity into legally binding standards, while at the same time not completely eradicate foreign ownership of important platforms or infrastructures. In this way, the EU's pursuit of digital sovereignty is more about changing the circumstances in which dominance is exercised than it is about displacing dominating players.

6.3 Risks and trade-offs

The EU is increasingly depending on digital regulations and competition laws to tackle structural inequalities in digital markets, yet this strategy carries considerable risks. Issues regarding regulatory overreach, innovation incentives, and legal clarity were highlighted by the increase in regulatory involvement, especially through ex-ante measures. These trade-offs are recognized in EU policy and academic discussions, indicating that the pursuit of digital sovereignty via legislation makes thoughtful evaluation of possible unintended impacts obligatory.

a) Excessive Regulation

A persistent worry is that ambitious regulatory frameworks might exceed their aims by restricting market behavior more than needed to safeguard competition. The report on Competition Policy for the Digital Era clearly cautions that engaging in fast-paced digital markets carries an increased likelihood of false positives, wherein practices are curtailed despite ambiguous or conjectural damage. It highlights that structural remedies and extensive access requirements might be challenging to adjust after implementation, especially as markets change quickly¹²⁹.

¹²⁸ Pirozzoli, *The Human-centric Perspective in the Regulation of Artificial Intelligence*, European Papers 9(1) (2024), p. 105–110

¹²⁹ Crémer, J., de Montjoye, Y.-A., & Schweitzer, H., Humboldt Universität Zu Berlin, “*Competition Policy for the Digital Era*” (2019), p. 31–36

Comparable concerns emerge regarding competition-law principles applied to digital markets. Graef emphasizes that expanding access requirements, particularly through concepts like the essential facilities doctrine, can disrupt firms' rightful motivations to invest in data gathering, platform creation, and innovation¹³⁰. Viewed this way, excessive reliance on access obligations risks pushing competition law toward a de facto regulatory role, one for which antitrust enforcement is not institutionally designed.

b) Innovation deterrence

Closely linked to regulatory overreach is the concern that intervention may discourage innovation. Nicoli and Iosifidis underline that the shift from ex post enforcement to ex ante regulation reflects a change in regulatory philosophy, moving beyond efficiency-based consumer welfare analysis toward fairness, market openness, and broader public interest considerations, in response to structural concentration in digital markets.¹³¹ While this shift responds to structural concentration, it may also impose compliance burdens that disproportionately affect innovative firms, including smaller or emerging players.

Similarly, the OECD cautions that poorly calibrated ex ante regulatory interventions may risk dampening innovation incentives, particularly if obligations are applied too broadly or without sufficient regard to differences in firms' roles and market positions. The report emphasises that digital markets are fast-evolving and that the competitive and innovation effects of early regulatory intervention may be difficult to predict, raising the risk that premature or overly rigid rules could constrain innovative conduct whose long-term effects remain uncertain¹³². From this angle, the trade-off lies between preventing entrenchment of market power and preserving the dynamic efficiencies that drive technological progress.

c) Legal uncertainty for digital businesses

A separate concern relates to the stability and predictability of the legal framework facing digital firms. As competition enforcement increasingly intertwines with sector-specific digital regulation, the framework becomes less predictable ex ante: Andriychuk notes that the DMA relies on open-ended ('opacity-by-design') obligations whose concrete scope is often calibrated through regulatory dialogue,

¹³⁰ Graef I., Tilburg University, TILEC Discussion Paper, "Rethinking the Essential Facilities Doctrine for the EU Digital Economy" (2019), p. 11-16

¹³¹ Nicoli, N. & Iosifidis, P., "EU digital economy competition policy: From ex post to ex-ante. The case of Alphabet, Amazon, Apple, and Meta", *Global Media and China* (2023), 8(1), pp. 24-38, source: doi: 10.1177/20594364231152673, p. 33-34

¹³² OECD (2021), "Ex ante regulation of digital markets", OECD Competition Committee Discussion Paper, p.20-22, source: <https://www.oecd.org/daf/competition/ex-ante-regulation-andcompetition-in-digital-markets.htm>

leaving greater discretion in how priorities are set and rules are applied¹³³. Although this development allows the law to respond more effectively to the realities of digital markets, it also introduces uncertainty by weakening the conceptual boundaries between competition law and other forms of public regulation.

This problem is intensified by the accumulation of overlapping legislative instruments. Undertakings active in the digital economy may simultaneously fall within the scope of EU competition law and an expanding body of sector-specific and horizontal regulatory regimes governing access to data and platforms. The interaction between these regimes is not always clear, particularly where their objectives only partially overlap. As Graef points out, uncertainty surrounding access obligations or data-sharing duties can influence investment and innovation incentives, especially where the temporal scope and precise content of such obligations remain difficult to predict¹³⁴. In these circumstances, firms may adopt a more cautious stance when deciding whether to invest in, expand within, or enter the European digital market.

Ultimately, the literature highlights that the EU's regulatory approach involves unavoidable trade-offs. Legal intervention can help address entrenched power imbalances and reduce reliance on dominant digital actors, but it also requires careful calibration. The central challenge is therefore not whether the EU should intervene at all, but whether it can sustain a regulatory framework that remains sufficiently precise, flexible and internally consistent as digital markets and technologies continue to evolve.

7. Conclusion

7.1 Recap of findings

This dissertation explored the significance of the essential facilities doctrine in today's digital markets and evaluated its importance for the European Union's wider goal of achieving digital autonomy via competition law. Based on the idea that access to digital infrastructure is a crucial element for competition, innovation, and economic strength, the analysis examined whether conventional refusal-to-deal principles can still effectively tackle contemporary forms of digital dominance.

The doctrinal examination in Chapter 2 revealed that the essential facilities doctrine in EU competition law is based on a careful equilibrium between maintaining

¹³³ Andriychuk O. "EU Digital Competition Law: The Socio-legal Foundations" *Cambridge Yearbook of European Legal Studies* (2023), p. 81-83, source: doi:10.1017/cel.2023.12

¹³⁴ Graef I., Tilburg University, TILEC Discussion Paper, "Rethinking the Essential Facilities Doctrine for the EU Digital Economy" (2019), p. 17-18

competition and safeguarding investment motivations. By examining cases like *Commercial Solvents*, *Bronner*, *IMS Health*, and *Microsoft*, the Court of Justice gradually established a series of stringent conditions regulating mandatory access. Essentiality, removal of genuine competition, and the lack of objective rationale arose as combined criteria, intended to limit intervention to unusual situations. Although this framework has provided legal clarity and moderation, it has also constrained the practical use of the doctrine, especially in markets marked by innovation and technological evolution.

Chapter 3 showed that these constraints become particularly evident in digital markets. In areas like cloud computing and artificial intelligence, so-called “facilities” are rarely isolated, fixed entities. Rather, they are made up of layered ecosystems that integrate infrastructure, data, software, interfaces, and proprietary expertise. The rigorous *Bronner* test finds it challenging to accommodate this level of complexity. Establishing indispensability is challenging when theoretical technical alternatives are available, even if the switch is costly in economic or practical terms. Additionally, lock-in effects often emerge not from an outright refusal to provide services but rather from design decisions, contractual methods, and interoperability limitations, which extend beyond the traditional boundaries of the doctrine. The engagement with intellectual property and trade secrets further restricts the scope for EFD-based intervention, illustrating the Court’s ongoing hesitation to mandate access when innovation incentives might be undermined.

In this context, Chapter 4 examined the Digital Markets Act as an answer to the inherent weaknesses of ex post competition enforcement. The DMA represented a conceptual transition from bilateral refusal-to-deal reasoning to a systemic perspective that emphasizes gatekeepers as essential intermediaries. Through the implementation of pre-emptive requirements regarding data access, interoperability, portability, and self-preferencing, the DMA successfully circumvents the evidentiary and procedural obstacles that have limited EFD enforcement. Instead of completely discarding competition law, it adapts its fundamental principles (prevention of market foreclosure and maintaining competition) into a regulatory structure more appropriate for rapidly evolving digital environments.

Chapter 5’s global comparison situated the EU’s strategy within a broader international framework. The comparison with the United States emphasized the EU’s higher readiness to take proactive measures and to include fairness and market structure in competition assessments, whereas the contrast with China stressed the EU’s unique dependence on law, rights, and judicial supervision instead of government control. From this viewpoint, EU digital sovereignty did not arise as

technological independence, but rather as the ability to influence markets via legally binding standards.

By analyzing competition law as an instrument of digital sovereignty, Chapter 6 synthesized these lessons. The analysis demonstrated that Europe's reliance on foreign digital infrastructures cannot be completely eliminated by ex ante legislation or traditional antitrust laws. Together, though, they can rebalance power dynamics, restrict unilateral control over important digital inputs, and integrate powerful players into a European legal system based on public responsibility and contestability.

Overall, the results indicate that while the EFD is still conceptually relevant, it no longer plays a major role in regulating digital markets. As a result of the EU's changing approach to competition and digital autonomy, its role has changed from being a principal access mechanism to a residual safeguard functioning in conjunction with a larger regulatory framework.

7.2 Normative reflections and Policy recommendations

The results of this dissertation indicate a measured yet intentional function for competition law in the European Union's overarching strategy to enhance its standing in the digital economy. Although legal action is undeniably essential to tackle deep-rooted power and structural reliance, the examination indicates that no solitary legal framework can, by itself, achieve digital sovereignty. Rather, the success of the EU's strategy relies on the combination of various instruments and the careful adherence to their limitations.

From a normative perspective, the essential facilities doctrine ought to stay an extraordinary remedy instead of transforming into a universal tool for imposing access duties in digital markets. The case law analyzed shows that the strict requirements of the doctrine play a crucial protective role, especially in situations with substantial investment, technological intricacy, or intellectual property. Broadened interpretation of the doctrine might undermine motivations for innovation and lead competition authorities into a continuous regulatory function that antitrust law wasn't intended for. Its importance though resides in functioning as a backup protection, rather than as a main instrument for influencing digital market frameworks.

Concurrently, the transition to ex ante regulation exhibits a practical acknowledgment of the constraints of conventional enforcement. The Digital Markets Act addresses ongoing structural characteristics of platform markets that

have demonstrated resistance to post-hoc intervention. Nonetheless, the evaluation also suggests that this regulation needs to stay flexible. Static or excessively rigid requirements threaten to limit competitive dynamics in fast-evolving markets, especially when compliance costs may disproportionately affect smaller companies or new entrants. Regularly re-evaluating regulatory assumptions is crucial to guarantee that contestability is encouraged while still fostering experimentation and innovation.

A further normative implication concerns coherence across the EU's digital regulatory framework. Measures such as the Data Act and the AI Act address access, portability and governance issues that competition law struggles to resolve on its own. Clearer coordination between these instruments would help reduce legal uncertainty and provide firms with a more predictable compliance environment.

Ultimately, the EU's strategy is best understood not as an effort to replace market forces, but as an attempt to shape the conditions under which digital power is exercised. A calibrated, layered approach offers the greatest chance of reconciling competition, innovation and autonomy in the long term.

7.3 Future directions: generative AI, platform governance, quantum computing

Looking ahead, the evolution of digital technologies is likely to place renewed pressure on the EU's competition and regulatory framework. Developments in generative artificial intelligence, the continued consolidation of platform ecosystems, and the emergence of new computational paradigms raise questions that cannot be answered simply by extending existing legal tools. Instead, they call for careful adaptation grounded in the principles already identified in this dissertation.

Generative AI, and especially the rise of large language models, illustrates these challenges clearly. As discussed earlier, foundational AI models increasingly function as general-purpose inputs used across a wide range of downstream applications. Their development depends on access to large volumes of data, advanced computing infrastructure and continuous training cycles, often controlled by a small number of firms. While this concentration may create forms of dependency, applying classic competition law concepts—such as indispensability or refusal to deal—remains problematic. The opacity, dynamism and modularity of such systems complicate any attempt to define a stable “facility” to which access could be mandated. In this context, the AI Act's risk-based approach appears more suitable than traditional antitrust enforcement. By imposing governance obligations tied to systemic risk rather than market dominance alone, the EU signals a shift toward shaping

technological development through standards and safeguards rather than through access mandates.

Platform governance will likely remain a central concern even beyond the initial implementation phase of the Digital Markets Act. While the DMA addresses many recurrent patterns of gatekeeper behaviour, its effectiveness will depend on enforcement practice and its capacity to evolve alongside market realities. As platforms increasingly integrate AI services, cloud infrastructure and data ecosystems into unified offerings, regulatory boundaries may become blurred. Future governance efforts may therefore need to focus less on individual obligations and more on ensuring coherence across instruments, avoiding overlaps that generate uncertainty while preserving the contestability gains achieved so far.

Quantum computing represents a more distant but potentially disruptive frontier. Although still largely pre-commercial, quantum technologies may eventually underpin critical services in cryptography, optimisation and scientific research. If control over quantum infrastructure becomes concentrated early, familiar questions about access, dependency and strategic autonomy may re-emerge. However, lessons from digital platform regulation suggest that premature reliance on competition law would be ineffective. Instead, early coordination between industrial policy, standard-setting and regulatory oversight may be required to prevent future bottlenecks without constraining innovation.

Overall, the future trajectory of EU digital governance is likely to reinforce the central conclusion of this dissertation: competition law remains an essential component of the EU's digital strategy, but it cannot operate in isolation. As technologies evolve, the emphasis will increasingly lie on flexible, layered governance that combines antitrust principles with targeted regulation, ensuring that emerging digital infrastructures develop within a framework compatible with competition, innovation and democratic oversight.

BIBLIOGRAPHY

ACADEMIC AND SCIENTIFIC LITERATURE:

1. European Parliament, European Parliamentary Research Service (EPRS), Towards a more resilient EU: Digital sovereignty for Europe, Ideas Paper (2020).
2. Elena Wiese, Martin Pflüger, and Kyra Harmes (Hogan Lovells), "Europe needs a data revolution – The role of competition law in access to data" (2024), source:

<https://www.hoganlovells.com/en/publications/europe-needs-a-data-revolution-the-role-of-competition-law-in-access-to-data>

3. Antonio Manganelli and Daniel Schnurr, "Competition and Regulation of Cloud Computing Services: Economic Analysis and Review of EU Policies", CERRE report (2024).
4. Klaus Kowalski, Cristina Volpin, and Zsolt Zombor (European Commission), Competition Policy Brief, "Competition in Generative AI and Virtual Worlds" (2024).
5. NOERR, "Easier access to (non-)essential digital platforms and other facilities under EU antitrust rules?" (2025), source: <https://www.noerr.com/en/insights/easier-access-to-non-essential-digital-platforms-and-other-facilities-under-eu-antitrust-rules>
6. Nikolas Guggenberger, "The Essential Facilities Doctrine in the Digital Economy: Dispelling Persistent Myths" (2021).
7. Daniel Mandrescu, "Online platforms and the essential facility doctrine – a status update following Slovak Telekom and the DMA" (2021), source: <https://www.lexxion.eu/en/coreblogpost/online-platforms-and-the-essential-facility-doctrine-a-status-update-following-slovak-telekom-and-the-dma/>
8. CJEU, Case C-233/23, Alphabet Inc. and Others v Autorità Garante della Concorrenza e del Mercato, Judgment of 25 February 2025.
9. Walid Chaiehloudj, "Achieving Digital Sovereignty via the DMA: A European Illusion" (2025), Journal of European Competition Law & Practice (Oxford University Press).
10. The Sherman Act (1890), sections 1 and 2.
11. Lipsky & Sidak, "Essential Facilities" (1999), Stanford Law Review.
12. Maurer & Scotchmer, "The Essential Facilities Doctrine: The Lost Message of Terminal Railroad", SSRN Working Paper (2014).
13. Robert Pitofsky, Donna Patterson, and Jonathan Hooks, "The Essential Facilities Doctrine under US Antitrust Law" (2002), Antitrust Law Journal.
14. Perić, G., Örebro University, School of Law, Psychology and Social Work, "EU Competition Law and Abuse of Dominance" (2022).
15. Inge Graef, Tilburg University, TILEC Discussion Paper, "Rethinking the Essential Facilities Doctrine for the EU Digital Economy" (2019).
16. Vassilis Hatzopoulos, College of Europe, "The EU Essential Facilities Doctrine" (2006).
17. OECD, Competition in the Provision of Cloud Computing Services, OECD Roundtables on Competition Policy Papers, No. 323 (2025).
18. CERRE, Competition and Regulation of Cloud Computing Services: Economic Analysis and Review of EU Policies (2024).
19. Marco Vargiu, "Revitalisation of the Essential Facilities Doctrine in EU Competition Law, The complementarity with the new Digital Markets Act" (2023).
20. Mehmet Bilal Ünver, "What cloud interoperability connotes for EU policy making: Recurrence of old problems or new ones looming on the horizon?" (2019), Telecommunications Policy.

21. Rok Dacar, "The Essential Facilities Doctrine, Intellectual Property Rights, and Access to Big Data" (2023), source: <https://link.springer.com/article/10.1007/s40319-023-01396-7>
22. Bertin Martens, Policy Brief, "Why artificial intelligence is creating fundamental challenges for competition policy" (2024), source: <https://www.bruegel.org/policy-brief/why-artificial-intelligence-creating-fundamental-challenges-competition-policy>
23. OECD, Artificial Intelligence Papers No. 18 (OECD Publishing), "Artificial Intelligence, Data and Competition" (2024).
24. Bertin Martens, Policy Brief, "Catch-up with the US or prosper below the tech frontier? An EU artificial intelligence strategy" (2024), source: <https://www.bruegel.org/policy-brief/catch-us-or-prosper-below-tech-frontier-eu-artificial-intelligence-strategy>
25. CJEU, Case C-165/19 P, Slovak Telekom v Commission, Judgment of 25 March 2021.
26. Emanuele Fazio, "Adapting Competition Law to the Digital Transition: Two Challenges" (2022), European Papers, source: <https://www.europeanpapers.eu/europeanforum/adapting-competition-law-to-digital-transition>
27. Inge Graef, "Tailoring the Essential Facilities Doctrine to the IT Sector: Compulsory Licensing of Intellectual Property Rights after Microsoft" (2011), Cambridge Student Law Review (TILEC).
28. Inge Graef, Data as Essential Facility: Competition and Innovation on Online Platforms, PhD Thesis (2016), KU Leuven.
29. Cyril Ritter, "Refusal to Deal and 'Essential Facilities': Does Intellectual Property Require Special Deference Compared to Tangible Property?" (2005), SSRN, source: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=726683
30. James Turney, "Defining the Limits of the EU Essential Facilities Doctrine on Intellectual Property Rights: The Primacy of Securing Optimal Innovation" (2005), Northwestern Journal of Technology and Intellectual Property.
31. Crémer, J., de Montjoye, Y.-A., and Schweitzer, H., Competition Policy for the Digital Era (2019), Humboldt Universität zu Berlin.
32. Ducci, F., "Gatekeepers and Platform Regulation, Is the EU moving in the right direction?" (2021), European University Institute / Sciences Po.
33. Georgieva, A., "The Digital Markets Act Proposal: Ex-Ante Regulation Infused with Competition Principles" (2021), European Papers.
34. Crémer, J., Fletcher, A., Heidhues, P., Schnitzer, M., Scott Morton, F., et al., "Fairness and Contestability in the DMA" (2023), Yale Journal on Regulation.
35. OECD, Ex Ante Regulation and Competition in Digital Markets (2021), OECD Competition Committee Discussion Paper, source: <https://www.oecd.org/daf/competition/ex-ante-regulation-andcompetition-in-digital-markets.htm>
36. Simone, C. and Laudando, A., "Principles and obligations of the Digital Markets Act in regulating the economic power of gatekeepers: Positive, negative or trade-off effects?" (2025), Electron Markets, source: <https://link.springer.com/article/10.1007/s12525-025-00788-6>

37. Hey, F., "Data Interoperability and Portability in the Digital Markets Act", TU Ilmenau Discussion Paper No. 192 (2024), Ilmenau University of Technology, Institute of Economics.
38. Ribera Martínez, M., "Article 5(2) DMA: The Prohibition on Processing, Combining and Cross-Using Personal Data across Core Platform Services" (2025), University Villanueva.
39. European Commission, Commission Staff Working Document Impact Assessment Report Accompanying the Proposal for a Regulation on contestable and fair markets in the digital sector (Digital Markets Act) (2020).
40. Digital Markets Act
41. de Streel, A. and Larouche, N., "The European Digital Markets Act: A Revolution Grounded on Traditions" (2021), Journal of European Competition Law & Practice.
42. Pranjali Gupta, "Competition Policy in the Age of 'Big Tech': Assessing the EU's Approach" (2020), Cambridge Journal of Science and Policy Exchange.
43. C. Paul Rogers III, "Competition Law and the EU and US Approaches to Dominant Markets: Will the Gap Narrow?" (2022), SMU Dedman School of Law.
44. Giorgio Monti, Taming Digital Monopolies: A Comparative Account of the Evolution of Antitrust and Regulation in the European Union and the United States (2022).
45. Skara, Gentjan, Oriona Muçollari and Bojana Hajdini, "Adapting the Competition Policy for the Digital Age: Assessing the EU's Approach" (2024), Laws, source: <https://doi.org/10.3390/laws13050064>
46. Rogier Creemers, "China's Social Credit System: An Evolving Practice of Control" (2018), SSRN Working Paper.
47. Chin, Yik Chan and Li, Ke, "Sovereignty in Cyberspace: EU and China Compared" (2021), paper presented at the 2021 Annual GigaNet Symposium, source: <https://www.giganet.org/2021SymposiumPapers/YikChin%20Chan%20%26%20Ke%20Li%202021.pdf>
48. Wei Huang, Wendy Zhou, Xiumin Ruan and Xi Zhang, "Antitrust Guidelines for the Platform Economy in the Era of Enhanced Antitrust Scrutiny" (2021), source: <https://www.competitionpolicyinternational.com/wp-content/uploads/2021/03/10-Antitrust-Guidelines-for-the-Platform-Economy-in-the-Era-of-Enhanced-Antitrust-Scrutiny-By-Wei-Huang-Wendy-Zhou-Xiumin-Ruan-Xi-Zhang.pdf>
49. Musoni, Melody, Poorva Karkare, Chloe Teevan and Ennatu Domingo, "Global Approaches to Digital Sovereignty: Competing Definitions, Contrasting Policy Approaches" (2023), ECDPM Discussion Paper 344.
50. Ruoxin Su and Dechun Zhang, "Adaptive Sovereignty: China's Evolving Legislative Framework for Transnational Data Governance" (2025).
51. Hechen Wang, "Competition Law Response to Platform's Banning Behavior: Rethinking EU and China's Solution" (2024), SSRN Working Paper.
52. Lukas von Ditzfurth, "The European Union's Pursuit of Digital Sovereignty Through Legislation" (2025), JIPITEC.

53. IE Center for the Governance of Change, Reclaiming Digital Sovereignty: The EU's Role in the Geopolitics of Digital Governance (2025).
54. Aifang Ma, "Digital legislation: convergence or divergence of models? A comparative look at the European Union, China and the United States" (2024).
55. European Commission, Shaping Europe's Digital Future (2020).
56. Regulation (EU) 2022/2484 establishing the Digital Decade Policy Programme 2030 (2022).
57. Anu Bradford, "The Brussels Effect" (2012), Northwestern University Law Review.
58. Floridi, L., "Soft Ethics and the Governance of the Digital" (2018), Philosophy & Technology, source: <https://doi.org/10.1007/s13347-018-0303-9>
59. Nicoli, N. and Iosifidis, P., "EU digital economy competition policy: From ex-post to ex-ante. The case of Alphabet, Amazon, Apple, and Meta" (2023), Global Media and China, source: doi: 10.1177/20594364231152673
60. Sara Guidi, European Papers (2023), European Forum highlight of 26 July 2023.
61. Blancato, F. G., "The cloud sovereignty nexus: How the European Union seeks to reverse strategic dependencies in its digital ecosystem" (2023), Policy & Internet, source: <https://doi.org/10.1002/poi3.358>
62. Pošćić, A. and Martinovic, A., "The Interplay Between the Essential Facility Doctrine and the Digital Markets Act: Implications to Big Data" (2023), Acta Universitatis Carolinae – Iuridica.
63. Hoffmann, "Fairness in the Digital Markets Act" (2023), European Papers.
64. European Parliament, "IPR and the Use of Open Data and Data Sharing Initiatives by Public and Private Actors" (Study, May 2022).
65. Pirozzoli, "The Human-centric Perspective in the Regulation of Artificial Intelligence" (2024), European Papers.
66. Andriychuk, O., "EU Digital Competition Law: The Socio-legal Foundations" (2023), Cambridge Yearbook of European Legal Studies, source: doi:10.1017/cel.2023.12

JURISPRUDENCE:

1. United States v. Terminal Railroad Association (U.S. Supreme Court, 1912).
2. Associated Press v. United States (U.S. Supreme Court, 1945).
3. Lorain Journal Co. v. United States (U.S. Supreme Court, 1951).
4. Otter Tail Power Co. v. United States (U.S. Supreme Court, 1973).
5. Commercial Solvents Corporation v Commission (Case C-6/73).
6. Oscar Bronner GmbH & Co KG v Mediaprint Zeitungsverlag GmbH & Co KG (Case C-7/97).
7. IMS Health GmbH & Co. OHG v NDC Health GmbH & Co. KG (Case C-418/01).
8. Microsoft Corp. v Commission (Case T-201/04).

9. Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP (U.S. Supreme Court, 2004).
10. Slovak Telekom v Commission (Case C-165/19 P, Judgment of 25 March 2021).
11. Alphabet Inc. and Others v Autorità Garante della Concorrenza e del Mercato (Case C-233/23, Judgment of 25 February 2025).

LEGISLATION:

1. Sherman Act (1890), Sections 1 and 2.
 2. Treaty on the Functioning of the European Union (TFEU), consolidated version, Article 102.
 3. Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector (Digital Markets Act).
 4. Regulation (EU) 2023/2854 of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act).
 5. Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services (Digital Services Act).
 6. Regulation (EU) 2024/1689 of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (Artificial Intelligence Act).
 7. European Commission, Communication “Shaping Europe’s Digital Future”, COM (2020) 67 final.
-