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## Challenges of Regulating Anti-Monopoly Enforcement and Unfair Competition in the Digital Economy

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**Abstract:** The digital economy has put the traditional anti-monopoly and anti-unfair competition tools under great pressure. This article takes as its starting point the theories behind Schumpeterian creative destruction, the two-sided market and the consumer welfare standard and analyses regulatory issues in five jurisdictions (EU, USA, UK, Germany and China) from 2018 to 2025. This qualitative research employs doctrinal legal analysis, comparative law, and economic-legal interpretation and regulatory practice evaluation to evaluate the effectiveness of existing competition frameworks. Based on the qualitative doctrinal analysis, it is suggested that the platform's characteristics are correlated with restrictions on traditional enforcement mechanisms, with data concentration and network effects showing the highest correlation. The six key gaps identified are: limitation of consumer welfare, neglect of exploitative abuse, fragmentation of enforcement, emphasis on exploitative conduct, fragmentation of mandate and remedial lag – the latter being the most prevalent. A comparative analysis shows that regulatory frameworks which combine ex ante commitments with ex post enforcement power generate optimal results with regard to timeliness, remedy diversity and market contestability. The research suggests that combined frameworks with institutionalised inter-agency coordination and multi-dimensional harm evaluation should be implemented. A restriction is that the information provided is limited to publicly available enforcement activities; it is possible that enforcement is continuing and confidential settlements are occurring.

**Keywords:** Algorithmic collusion, Competition law, Data-driven market power, Digital platforms, Ex ante regulation, Remedial lag.

### Introduction

The digital economy has completely altered market structures, competition and the character of actions of firms in all jurisdictions worldwide. Competition law is rooted in a model of industrial markets with physical assets, but is now being applied to platform markets where data, algorithms and network effects are key drivers of market competition (Eshbayev et al., 2022). As digital platforms have grown in power, it has become clear that traditional antitrust measures (Parker et al., 2020) are failing to achieve the desired goals. The core tenets of traditional enforcement, clear boundaries of the markets, the principle of market boundaries and price-based harm to consumers, exclusionary behaviour, are not applicable in multi-sided digital markets (Fen et al., 2025). This recognition has led to a reconsideration of theory and institutions of competition regulation by governments globally (Bhuiyan et al., 2023; Decker, 2023).

Some underlying characteristics that hamper competition enforcement are worth particular investigation. The network effects create the winner-takes-most dynamics whereby the value of a platform increases with user adoption, making the conventional market share thresholds poor proxies to determine competitive importance (Fainmesser & Galeotti, 2020). Market power based on data only increases this form of entrenchment by enabling proprietary datasets to establish self-reinforcing barriers that are difficult to overcome by new entrants (Hu et al., 2023; Mosig et al., 2021). The algorithmic pricing mechanisms also make it harder to enforce because they facilitate tacit coordination without explicit human coordination, thus bypassing the existing collusion doctrines (Li et al., 2023; Zhao, 2023). Asymmetrical market structures pose significant challenges for market definition tools based on prices, and the speed of innovation is rapid, compared to fixed processes (Hokmabadi et al., 2024). All these happen not as individual factors, but as a system, and altogether, these elements make piecemeal adjustments of the doctrines inadequate to re-establish effectiveness in enforcement. Recent research has reported that there are continual deficiencies in enforcement in digital markets, although there are pronounced gaps in analysis. Fragmented enforcement structures and platform market power are central impediments, and exploitative conduct is shown to be systematically under-enforced (Degen & Gleiss, 2025; Geradin & Katsifis, 2022). Another study indicates the unforeseen implications of new regulatory ideas (Cennamo et al., 2023).

### ***Research Problem***

Despite the increased scholarly interest in addressing the competition law issues raised by digital platforms, the structural characteristics of the platforms and the traditional approaches to anti-monopoly enforcement are not converging. As far as the literature is concerned, platform-specific characteristics (network effects and data-driven market power, say) or doctrinal issues (the limits of the consumer welfare standard, the lack of institutional responses, etc.) have been examined. There is little systematic research that correlates the attributes of platforms to variations in enforcement across jurisdictions. This study addresses this void by examining the platform characteristics and doctrinal disruptions and enforcement outcomes in other jurisdictions. This study examines the fundamental issue that current anti-monopoly and anti-unfair competition laws lack doctrinal precision and institutional design, rendering them inadequate for effectively detecting, remedying, and deterring anti-competitive behaviour in digital markets. Additionally, there are notable enforcement deficiencies, including remedial delays, which hinder market contestability and diminish consumer welfare.

### ***Research Aim and Research Questions***

The rise of the digital economy has transformed competitive dynamics, and existing rules are not effective. This study is motivated by the desire to identify, explain and fix the core issues in the enforcement of the existing anti-monopoly and unfair competition law. This study aims to:

- To identify and systematically analyse the key regulatory and enforcement challenges that digital platforms, data-driven market power, and algorithmic business practices pose to traditional anti-monopoly and unfair competition frameworks.

- To critically evaluate the effectiveness of existing legal and economic instruments in addressing monopolistic behaviours and anti-competitive conduct within multi-sided digital markets, highlighting specific gaps and inconsistencies.

- To propose a set of targeted legal and policy recommendations for enhancing the regulatory architecture governing competition enforcement in the digital economy, informed by comparative analysis of international regulatory models.

Defining the scope and boundaries of this research activity and providing guidance to the analysis is essential, and is provided by a clear set of research questions. These questions are a reflection of the regulatory issues created by the current competition law framework and the new digital markets model. The following are the research questions used for this study:

- What specific structural and operational characteristics of digital platforms including network effects, data concentration, and algorithmic coordination render traditional anti-monopoly enforcement mechanisms ineffective in detecting and remedying anti-competitive conduct?

- To what extent do existing legal frameworks governing unfair competition adequately address the emergent harms of the digital economy, such as self-preferencing, killer acquisitions, exploitative data practices, and algorithmic collusion, and where do the most critical regulatory gaps lie?

- How can regulatory models be reformed or redesigned, drawing on comparative analysis of international approaches such as the EU's Digital Markets Act, Germany's GWB amendments, and US antitrust developments, to more effectively ensure competitive fairness and market contestability in the digital economy?

### ***Research Focus***

As regards the existing literature on law and economics of regulating digital markets, the existing research is relevant in five ways. First, it does not take an anti-monopoly law or unfair competition law one-dimensionally. Rather, it represents a two-pronged and in-depth examination of the anti-monopoly law enforcement and unfair competition law enforcement, which is not commonly practised in the current body of literature. Second, it examines the analysis by focusing on the special characteristics of the digital economy rather than considering the digital economy as a system. Third, it adopts a comparative law method where it concurrently looks at regulatory trends in the EU, the US and other countries to learn some lessons. Fourth, it engages with doctrinal legal analysis and economic theory to not only review the law in books but also its effective implementation. Finally, the study concludes with specific, jurisdiction-specific recommendations for policy rather than vague recommendations for reform in an effort to bridge the gap between academic criticism and regulatory prescription.

### ***Literature Review***

Competition exists in Schumpeter's theory of creative destruction not only as a price mechanism, it is an innovation process, and traditional theories of regulation are brought into question (Schumpeter, 2013). Two-sided market theory similarly explains how cross-side network effects create value in digital markets that is not present in traditional markets (Rochet & Tirole, 2003). The essential facilities doctrine is based on whether or not 'dominant firms' that possess 'essential facilities' (such as data) must make them available to competitors (*Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 1985; *MCI Communications Corp. v. AT&T Co.*, 1983). Finally, the consumer welfare standard, adopted since the late 1970s, is often criticised as inapplicable to zero-price digital markets (Bork, 1978). These theoretical frameworks move beyond the linear view of competition to illustrate varying aspects of competition, both dynamic and static, and price-based versus non-price-based competition, with these differences further exacerbated in multi-sided digital markets where data, network effects, and innovation cycles add layers of complexity to the traditional concepts of competition.

### ***Competition in the Digital Environment***

Conventional competition enforcement has come under growing scrutiny about the structural issues that digital markets present (Tirole, 2023). Landmark litigation has occurred in these challenges, all over jurisdictions. These enforcement issues are reflected in several landmark cases. The difficulties in implementing abuse of dominance regimes in data-driven behaviour are shown by the Bundeskartellamt's decision on Facebook and the European Commission's decision on Google Shopping. The Booking.com MFN clauses proceedings highlighted the lack of effectiveness of the multi-layer enforcement system in the EU, and the Google Android case illustrated remedial lag in the rapidly moving digital economy. All of the cases demonstrate that the challenges we have highlighted in the literature, including “network effects,” “data-driven market power,” “jurisdictional fragmentation,” and “regulatory lag,” are not theoretical but are reflected in concrete enforcement cases, and indicate the importance of comparative analysis of institutional design in guiding regulatory response. These structural features pose distinct challenges for conventional enforcement approaches (Nachbar, 2023).

### ***Legal Constraints***

A rich literature examines the effectiveness of existing competition law in tackling harms in the digital market. The evaluation of competitive harm is based on the consumer welfare standard, which considers the effects on prices, which is a measure that is greatly constrained by the fact that Zero Price markets are where data and attention are the currency. In such settings, the zero price effect raises doubts about the validity of traditional measures of consumer damage (Witte & Krämer, 2025; Mileros & Forchheimer, 2022). Exploitative practices, such as by dominant platforms can be addressed using specific legal concepts, but they are not yet settled in digital markets (Colangelo, 2023; Yang al., 2024). The issue of double jeopardy and regulatory gaps can arise in the absence of harmonisation of national and supranational competences, for example, in relation to cross-border conduct of digital platforms. Further, a doctrine of exclusion is likely to conceal the competitive harm caused by data collection and ecosystem-building practices, which might not fit into any of the existing categories of anti-competitive conduct. The division between enforcement responsibilities of competition, consumer and data protection authorities gives rise to further enforcement gaps that dominant firms capitalise on (Kerber, 2022).

### ***International models and reforms***

The analysis of regulatory developments across the globe reveals convergence and divergence on the governance of platforms. The EU Digital Markets Act (DMA) sets out an ex ante, centralised framework for regulating the conduct of gatekeepers, which are defined according to quantitative criteria and subject to specific obligations, such as interoperability requirements, prohibitions on data portability and self-preferencing (Geradin & Katsifis, 2022). The amendments to the GWB in Germany (Section 19a) will give the Bundeskartellamt, as the sole enforcement body, the power to impose specific obligations on companies that it considers to have a paramount role across the market in a qualitative assessment process, which will make the regime more flexible but less predictable in the implementation of the obligations (Jungermann, 2022). The UK's DMCCA 2024 introduces a specialised regulation unit (Digital Markets Unit) within the Competition and Markets Authority, featuring an ex ante designation as well as specific conduct requirements, which will be monitored by a dedicated body (Ozili, 2025). These three models are different in how they are designated, in quantitative threshold, German qualitative assessment and in the determination of strategic market status in the UK and represent different institutional preferences for certainty versus flexibility and administrative capacity. In contrast, the United States has been primarily dependent on ex post antitrust actions under the Sherman and Clayton Acts, with some legislative proposals indicating a shift towards regulatory action (Bostoen, 2023). The 2022 Anti-Monopoly Law amendments to China include technical improvements to the rules for the regulation of monopoly agreements, with enforcement remaining centralised under the State Administration for Market Regulation (Wu & Wang, 2023). The different approaches represent different legal traditions, institutional structures and policy preferences, and thus regulatory design should take into account the jurisdiction-specific context and not aim for a one-size-fits-all design.

## **Research Gap**

Prior scholarship has focused on specific aspects of the regulation of digital markets without bringing them into a coherent framework. The literature has explored the nature of platform characteristics, such as network effects and data-driven market power, as sources of competitive advantage (Boudreau et al., 2022; Ploog & Rietveld, 2025). Similarly, the literature on enforcement has covered the lack of enforcement efforts and fragmented institutional responses, as well as the narrow scope of the consumer welfare standard (Geradin & Katsifis, 2022; Kerber, 2022). At the same time, comparative reviews of regulatory models have been conducted in the context of the EU's Digital Markets Act, the GWB amendments in Germany and the UK's DMCCA, but mostly through single-jurisdiction or single-instrument perspectives (Bostoen, 2023; Ozili, 2025). What is missing is a whole-of-platform analysis of specific platform attributes and specific enforcement shortcomings, and then a linkage of those enforcement shortcomings to targeted regulatory interventions. The three hypotheses to be tested in this research attempt to fill this void.

*H1: Digital platform characteristics including network effects, data concentration, and algorithmic coordination are associated with measurable limitations in the effectiveness of traditional ex post enforcement mechanisms, specifically in market definition, dominance assessment, and collusion detection.*

*H2: Existing competition frameworks exhibit identifiable gaps in enforcement that can be operationalised through specific indicators: the frequency of unaddressed exploitative conduct, documented instances of cross-jurisdictional coordination failure, and the exclusion of non-price competitive harms from prevailing assessment standards.*

*H3: Regulatory models combining ex ante obligations with retained ex post enforcement capacity are expected to demonstrate more timely intervention, a broader range of remedial options, and improved market contestability outcomes in qualitative assessments compared to exclusively litigation-driven or purely ex ante approaches.*

## **Materials and Methods**

The research design used in this study is multi-methods approach with legal research method, which is a qualitative study. The structuring combines doctrinal legal analysis, comparative law, the economic legal interpretation and the assessment of the practice of regulation. A combination of these is selected as digital market regulation is multi-dimensional and requires a multi-dimensional approach, going beyond one of these analytical angles, namely legal doctrinal development, economic market transformation and institutional design variation. Due to the unique nature of the domain, the methodological structure of this study differs from that of a typical FEL study, which follows the following subsections: Sample, Instrument and Data Analysis. Legal doctrinal research in the field of competition enforcement is not of the social-scientific type and is not based on a sample of subjects or on standardised instruments; it is based on primary legal sources (legislation, case law, regulatory decisions) for specific jurisdictions. The four following parts (Doctrinal Legal Analysis, Comparative Law, Economic-Legal Interpretation and Regulatory Practices) illustrate the four analytical angles of digital market regulation: legal doctrine, cross-jurisdictional comparison, economic-legal interplay and institutional practice. This is in line with the existing scholarship in comparative law.

### ***Doctrinal Legal Analysis***

The doctrinal legal analysis methodology is the basic methodology, which consists of a systematic examination of the basic sources of the law in the five jurisdictions of the European Union, the United States, the United Kingdom, Germany and China. Such legislation discussed is the EU Digital Markets Act 2022, the Competition Act (GWB) Section 19a amendments 2021 in Germany, and the Competition and Consumers Act 2024 of the UK. Similarly, the Sherman Act and the Clayton Act of the US, as well as the Anti-Monopoly Law amendments of 2022 in China, are examined. Case law is systematically analysed to determine how judicial institutions have interpreted and applied competition doctrines to digital

platform conduct (Ganesh, 2025). Some of the key cases that were reviewed are: *United States v. Google LLC* (2024), *Bundeskartellamt v. Facebook* (2019), *Booking.com B.V. v. 25hours Hotel Company Berlin GmbH* (2024), and *Google Android* (2018). This doctrinal analysis maps the connection between platform characteristics and their coverage under the current doctrinal frameworks of competition law enforcement, in order to uncover trends in how platform features are dealt with based on the structure of competition law enforcement mechanisms. The case law analysis also allows for meaningful comparison of enforcement strategies among jurisdictions, which serves as the basis for the comparative analysis of the effectiveness of the regulation. The selection of cases for this study was based on three criteria: (i) the case is about a digital platform that is the main subject of the enforcement action; (ii) the case covers one of the six identified regulatory gaps; and (iii) the case was decided by a competition authority or a court and is published during the period 2015–2025. These criteria crosscut in two ways: first, with respect to jurisdictional diversity, and second, with respect to the coverage of distinct doctrinal issues.

### ***Comparative Law***

The comparative legal approach uses a functional comparative approach to examine the regulatory responses in each of the five jurisdictions. The framework includes an analysis of the different kinds of competition challenges in digital markets before which legal systems have to react, with three predefined comparison criteria examined: (i) regulatory model design (ex ante, hybrid, ex post litigation, state-directed); (ii) designation mechanisms (quantitative thresholds, assessment of authority, designation based on strategic market status (SMS), case-by-case adjudication, state determination); and (iii) substantive obligations (self-preferencing prohibition, data portability requirements, interoperability obligations). Institutional architecture is analysed by looking at enforcement bodies, their powers and formal mechanisms for inter-agency coordination. Three qualitative measures are used to evaluate the effectiveness of each regulatory model: timeliness of the beginning of enforcement proceedings, diversity of remedies available, and evidence of changes in platform behaviour after the intervention, such as evidence of market entry, user switching rates, and changes in platform behaviour.

### ***Economic-Legal Interpretation***

Economic-legal interpretation connects economic analysis of digital markets with the legal evaluation of the effectiveness of regulation. This approach involves examining the economic traits of digital platforms – such as multi-sided markets, network effects, data feedback loops, algorithmic pricing coordination, cross-border operations, rapid innovation cycles – in a legal context to determine whether regulatory action deals with the facts of competition harm. It takes a qualitative perspective on how each economic characteristic is currently dealt with in the institutional and doctrinal frameworks of competition law, and how well existing competition doctrines reflect the competitive impact of digital market dynamics. This approach does not treat economic characteristics as disembodied objects to be studied alone, but seeks to link the economic aspects to the legal analysis in order to gauge the consistency of the market with the regulatory responses.

### ***Regulatory Practices***

Regulatory practice assessment evaluates the activity by the competition authorities, including enforcement decisions, guidelines and market studies. As part of the systematic review, the practices of the European Commission (DG Competition), German Bundeskartellamt, UK Competition and Markets Authority and its Digital Markets Unit, the U.S. Federal Trade Commission and Department of Justice, and the State Administration for Market Regulation in China are examined. This approach provides qualitative evidence of the type of result from enforcement: structural and behavioural; and of documented improvements in market contestability, as measured by observable aspects of the market — such as the number of entrants, the percentage of users switching to other platforms, and changes in platform behaviour after the regulator's action. It also allows for the identification of commonalities in

regulatory gaps during the enforcement processes and to evaluate their frequency and distribution by jurisdiction, among the agency's documented decisions and reports.

### ***Hypothesis Verification Hierarchy***

In the qualitative doctrinal study, hypothesis validation is achieved by systematically analyzing legal sources, case law and regulatory practices in the validation of analytical propositions and the evaluation of a conceptual framework, and not by testing that is capable of falsification as in empirical-quantitative study. The three hypotheses take the form of analytical propositions, which are illustrated and supported by qualitative doctrinal synthesis, not with statistics.

The verification process is in a sequential hierarchy. In the first phase, doctrinal and economic-legal interpretation of case law and legislation is used to explain doctrinal patterns in the five jurisdictions, pinpointing limits imposed by characteristics of digital platforms on traditional enforcement mechanisms, as part of the answer to H1. H2 seeks to find doctrinal and procedural gaps in the various types of documents, making use of case law and representative regulatory practice assessment. The third stage considers H3 by examining how well this variety of litigation (ex ante, hybrid, ex post) and regulatory choices (state-directed regulation) performs through qualitative metrics (timeliness, diversity of remedies and contestableness of the market).

The three stages are cumulative: identification of enforcement challenges (H1) is the basis for the specification of enforcement gaps (H2) and for the evaluation of alternative regulatory architectures (H3). This is a sequential structure that allows the analysis to be coherent, using different sets of qualitative evidence for each hypothesis.

### ***Methodological Justification***

The four methods chosen are used because they all can answer the three study research questions, each of which focuses on a different level of analysis. The first research question tackles the ineffectiveness of traditional enforcement mechanisms in light of the structural characteristics of digital platforms, and is answered by doctrinal legal analysis of legislation and case law, as well as economic-legal interpretation, which aims to link market characteristics to legal doctrines. Existing frameworks are compared through the lens of comparative law to seek to identify regulatory gaps in terms of jurisdictional variation in enforcement approaches and in institution coordination in the second research question: What is the extent of regulatory gaps in existing frameworks? The third research question (what are the ways for the reform of the regulatory model) is answered by regulatory practice assessment, which is based on the qualitative elements that were defined in the comparative framework and observed in the regulatory practice. Each method has its own limitations: doctrinal analysis is limited to a given jurisdiction, and cannot capture the realities of enforcement in practice; comparative law rests on assumptions of functional equivalence across legal systems; economic-legal interpretation involves normative interpretation and translation of the market concepts into legal categories; and regulatory practice assessment is limited to practice that can be gleaned from the public record of agency documents, which may not be representative of confidential enforcement practice. The limits of these methods are recognised, and the mixture of approaches leads to cross-validation between the various types of evidence and thus to a more reliable overall result.

## **Results**

The next section reports on a qualitative descriptive synthesis, not in the statistical sense. The tabular presentation of the detailed analysis of individual cases and the systematisation of the doctrinal issues are presented here, while the landmark cases are introduced in a brief conceptual manner in the Literature Review. It is a summary of the main findings of the systematic application of doctrinal legal analysis, comparative law, economic-legal interpretation and regulatory practice assessment. The results are presented in line with the three study hypotheses. The qualitative results of the analysis of laws and cases are presented in the tables. The analysis of legislation, case law, enforcement decisions

and regulation from the European Union, the United States, the United Kingdom, Germany and China (2018–2025) has been used to derive all the findings.

As mentioned in the methodological caveat in the subsection Hypothesis Verification, the hypotheses put forward in this study are not claims that can be statistically proven or disproven. The qualitative congruence between the doctrinal synthesis that follows and the expectations that are outlined in H1, H2, and H3 is considered illustrative support for the analytical framework and not to be interpreted in statistical terms. The tables and accompanying commentary illustrate the correspondence of the qualitative evidence from legislation, case law, and regulatory decisions with the hypothesised relationships and gaps, and the disclaimers about causal inference and the need for additional empirical research are present throughout.

Table 1 outlines the doctrinal mechanisms used to undermine the enforcement of each platform characteristic and the results found in the various jurisdictions.

**Table 1**  
*Platform Characteristics and Associated Doctrinal Difficulties*

<b>Platform Characteristic</b>	<b>Mechanism Disrupted</b>	<b>Doctrinal Pathway of Disruption</b>	<b>Practical Consequence</b>	<b>Jurisdictions</b>
Multi-Sided Market Structure	Market definition (SSNIP)	Zero-price services render price-based substitution inapplicable	Markets defined too narrowly or broadly	EU, US, UK, DE, CN
Network Effects	Dominance assessment	User adoption rather than revenue drives competitive significance	Market share thresholds underestimate entrenchment	EU, US, UK, DE
Data Feedback Loops	Barriers to entry analysis	Proprietary datasets create non-replicable advantages	Entry barriers systematically underestimated	EU, US, UK, CN
Algorithmic Pricing	Collusion detection	Automated price alignment without explicit human agreement	Tacit collusion falls outside prohibition scope	EU, US, UK
Cross-Border Operations	Extraterritorial enforcement	Conduct originates beyond national jurisdictional reach	National authorities lack effective enforcement reach	EU, US, UK, DE, CN
Rapid Innovation Cycles	Remedy design	Market conditions evolve faster than remedial processes	Remedies obsolete before implementation	EU, US, CN

*Note.* The table illustrates the associative relationships between platform characteristics, doctrinal disruptions, and observed enforcement consequences identified in the qualitative analysis.

*Source:* Author's compilation based on doctrinal analysis of the following legislative instruments and case law: EU Digital Markets Act 2022; Germany GWB Section 19a (2021); UK DMCCA 2024; US Sherman Act and Clayton Act; China AML amendments 2022; United States v. Google LLC (No. 1:20-cv-03010); Bundeskartellamt v. Facebook (Germany, 2019); Booking.com B.V. v. 25hours Hotel Company Berlin GmbH, Case C-264/23 (2024); Google Search (Shopping), Case AT.39740 (2017); Google Android (EU, 2018–2022)

Table 1 shows the doctrinal challenges found with each platform trait, based on a systematic review of the laws and case law of the five jurisdictions. The multi-sided market structures create problems in applying the SSNIP test in all 5 jurisdictions. Network effects make it difficult to assess dominance because the importance of a network is determined by the size of its user base rather than by the revenues that it generates. Data feedback loops make it difficult to breach first because they generate their own datasets that others can't easily duplicate. Agreements may not provide for certain forms of practical (tacit) collusion, but algorithmic pricing coordination can. Jurisdictional reach

limitations for national authorities are created due to cross-border operations. Remedial processes are not effective enough due to the quick innovation cycle. The qualitative observations were in line with the expectations of H1, but additional empirical evidence would be needed to confirm causal relationships.

The discussion then highlighted some of the vital areas in which current competition law regimes have gaps. These gaps, together with their doctrinal backgrounds, case law examples and practical harms reported, are given in Table 2.

**Table 2**

*Critical Gaps in Competition Law Frameworks for Digital Markets*

<b>Regulatory Gap</b>	<b>Doctrinal Foundation</b>	<b>Illustrative Case</b>	<b>Nature of Deficiency</b>	<b>Documented Harm</b>
Consumer Welfare Limitation	Harm measured through price effects	United States v. Google LLC (No. 1:20-cv-03010)	Non-price harms excluded from assessment	Data exploitation and attention extraction present ongoing regulatory challenges, with developing responses under the GDPR and DMA
Exploitative Abuse Neglect	Abuse doctrines designed for excessive pricing	Bundeskartellamt v. Facebook (DE, 2019)	Categories do not fit unfair data terms	Consumers lack remedy for unfair data practices
Enforcement Fragmentation	Multi-level governance without clear primacy	Booking.com B.V. v. 25hours Hotel Company Berlin GmbH, Case C-264/23 (2024)	Overlapping competencies risk double jeopardy	Legal uncertainty and forum shopping
Exclusionary Conduct Emphasis	Doctrinal prioritisation of foreclosure	Google Search (Shopping), Case AT.39740 (2017)	Data accumulation strategies unexamined	Broader ecosystem harms escape scrutiny
Mandate Fragmentation	Competition, consumer, and data protection separated	UK DMU Establishment (2024)	Regulatory silos uncoordinated	Inconsistent outcomes across agencies
Remedial Lag	Ex post intervention after harm crystallisation	Google Android (EU, 2018–2022)	Four-year interval between decision and remedy	Market tipped irreversibly before remedy

*Note.* For case selection criteria, see the Methods section (Doctrinal Legal Analysis). Representativeness is based on jurisdictional diversity and coverage of distinct doctrinal issues. Documented harm describes the regulatory consequence identified in the relevant decision or authoritative commentary.

Source: Author's compilation based on doctrinal analysis of case law and enforcement decisions: United States v. Google LLC (No. 1:20-cv-03010); Bundeskartellamt v. Facebook (Germany, 2019); Booking.com B.V. v. 25hours Hotel Company Berlin GmbH, Case C-264/23 (2024); Google Search (Shopping), Case AT.39740 (2017); Google Android (EU, 2018–2022); UK DMU Establishment (2024)

Table 2 provides details about six gaps found in current competition frameworks. As shown in the limitation of consumer welfare example – United States v. Google LLC– the challenge for non-price harms in a price-centric assessment framework is indicative. The problem of the existing categories of abuse is reflected, for example, in the proceedings brought by the Bundeskartellamt against Facebook and the exploitation of the data in terms of abuse. The fragmentation of enforcement, as seen in the MFN proceedings of Booking.com, is a cause for concern because of possible duplication of competencies and

double jeopardy issues. Google Shopping provided a different focus on exclusionary conduct, which meant that other patterns of data accumulation were not the focus of the review. The UK's DMU is an institutional solution to the requirement for fragmentation. The challenge of timely intervention in the fast-moving digital markets is exemplified by remedial lag, as seen in Google Android. The qualitative observations made reflect the expectations for H2, but this needs to be confirmed through further empirical research to determine how common and serious these gaps are across jurisdictions.

The third stage juxtaposed the results of regulatory model design and enforcement in different jurisdictions. Table 3 shows the comparison of the regulatory architecture and its effectiveness indicators.

**Table 3**

*Comparative Regulatory Architecture Across Jurisdictions*

Jurisdiction	Model	Designation	Self-Preferencing	Enforcement Body	Observed Enforcement Approach
EU	Ex ante (DMA)	Quantitative thresholds	Prohibited	European Commission	Proactive obligations with mandatory compliance requirements
Germany	Hybrid (GWB §19a)	Authority assessment	Authority-imposed	Bundeskartellamt	Tailored interventions with case-by-case obligations
UK	Ex ante (DMCCA)	SMS designation	Prohibited	DMU (within CMA)	Proactive obligations with mandatory compliance requirements
US	Ex post litigation	Case adjudication	Addressed through enforcement actions	FTC & DOJ	Case-by-case enforcement through judicial proceedings
China	State-directed (AML)	State determination	Not addressed	SAMR	Centralised enforcement aligned with industrial policy objectives

*Note.* The "Observed Enforcement Approach" is assessed qualitatively based on documented patterns of enforcement activity, agency decisions, and regulatory design features. Self-preferencing in the US is addressed through existing antitrust enforcement actions rather than explicit statutory prohibition.

*Source:* Author's compilation based on comparative analysis of: EU Digital Markets Act (2022); Germany Competition Act GWB Section 19a amendments (2021); UK Digital Markets, Competition and Consumers Act (2024); US Sherman Act (1890) and Clayton Act (1914); China Anti-Monopoly Law amendments (2022); European Commission enforcement decisions; Bundeskartellamt decisions; CMA decisions; FTC and DOJ enforcement actions; SAMR decisions (2018–2025)

Table 3 shows that there is a considerable difference in regulatory architecture between the five jurisdictions. Germany has a hybrid system allowing the competition authority to impose specific obligations after a qualitative assessment, while the EU and UK have comprehensive ex ante models with mandatory obligations. The US has adopted an ex post approach to deal with the issue of platform behaviour, while self-preferencing is handled via enforcement action rather than through explicit bans. The Chinese approach is a state-directed one, with a centralised enforcement mechanism that is in line with the industrial policy goals. The differences between these architectures have discernible consequences for enforcement, such as the nature of the remedies that are available and how platform conduct is dealt with. Findings from a comparative analysis of the qualitative support for the expectations expressed in H3, which were drawn from the analysis, suggest unique enforcement features, but further empirical research is required to draw this conclusion.

## **Discussion**

The results of the present study have profound implications towards the theoretical knowledge of and practical regulation of anti-monopoly laws in the digital economy. This part discusses the interpretation of the results in the context of the current legal theories and the international regulatory practice, models of regulation and evaluates their effectiveness and policy implications.

The analysis is performed at three different layers of analysis, which are interconnected. The economic layer refers to the structural characteristics of digital platforms, the network effect, the centralisation of data on platforms and the algorithmic coordination of platforms and their dynamics. A legal layer is linked to the doctrinal tools of competition protection, as well as their capacity to address anti-competitive conduct in the digital markets. The institutional layer is related to architectural design and comparative effectiveness. Explanation of these layers is presented separately to each layer and final conclusions to regulatory reform at the end of the discussion, and a final layer specific synthesis of implications given at the end of the latter.

### ***Comparison with Prior Research***

This paper contributes to and advances research on digital market competition enforcement. This analysis confirms and supports Geradin and Katsifis (2022) findings on the impediments to antitrust action in fragmented enforcement systems and platform market power. The strength of the network effects, the concentration of data, and algorithmic coordination on platforms are the central topics of this study, which maps how these changes in platform characteristics trigger doctrinal disruptions in the jurisdictions.

The "remedial lag" is the most prevalent enforcement shortfall, and this is the reason behind Kerber's (2022) assertion that competition, consumer and data protection laws' enforcement activities create regulatory gaps. This paper builds on Kerber's research by showing that remedial latency appears in all five jurisdictions and that it is related to the structure of the enforcement model.

The comparison results confirm the concerns of Cennamo et al (2023) about the possible negative impact of ex-ante laws such as the Digital Markets Act on innovation. This analysis adds complexity in that it identifies a hybrid approach (such as the GWB Section 19a in Germany) has more flexibility but less legal certainty than full ex ante frameworks. This gap illustrates how the effectiveness of the regulatory models depends on the institutional contexts and legal systems in different jurisdictions.

### ***Structural Challenge to Traditional Enforcement***

Platform effects, network effects, data concentration and multi-sided markets are all entwined, meaning that a piecemeal doctrinal change is an ineffective way to restore efficiency in enforcement. Characteristics of platforms, such as network effects, data concentration and multi-sided market structures, are interrelated, and an enforcement change toward one characteristic (e.g. adapting the concept of market definition taking into account multi-sided markets without considering the data concentration or network effects) can affect another characteristic of the change rather than solve it (Morbel, 2025). This finding corresponds with theoretical arguments that the consumer welfare standard – which focuses on price consequences – does not suffice to encompass the entire competitive landscape of digital ecosystems. The doctrinal analysis performed for this study represents a systematic description of the specific mechanisms by which these restrictions are operative, but more empirical work would need to be done to determine the strength and direction of the associations. The results of the study support the theory that an incremental change in the doctrine will not be enough to bring the effectiveness of the enforcement back to full. Additionally, the implementation of algorithmic pricing mechanisms introduces forms of coordinated conduct that cannot be regulated through the usual anti-cartel rules based on agreements (Inderst & Thomas, 2025)

The persistence of all six identified gaps across multiple jurisdictions suggests a systemic failure of traditional competition frameworks, not merely isolated procedural shortcomings. Remedial lag is

one such lag that is significant and should be taken into account while analysing. Even though remedial lag is a real-world issue in markets that undergo rapid changes in innovation and have high network effects, it is also a structural issue of the models of ex post enforcement. The time between anti-competitive activity and action by the regulator could cause market positions to become entrenched before they're addressed, reducing the value of a remedy as a way to restore a market. The fact that exploitative abuse is a topic that seems to be treated somewhat lightly in jurisdictions with a long history of consumer welfare and that seems to be less addressed by consumer welfare policies in such jurisdictions points to a degree of doctrinal path dependence that could limit the evolution of enforcement. The consumer welfare standard is an analytical focus that focuses on exclusionary conduct that increases price, which may mask the existence of exploitative conduct that lowers quality, extracts data, and/or imposes unfair terms in the contracts. Enforcement fragmentation between jurisdictions is larger in the EU's multi-level governance system and much smaller in China's centralised enforcement system, and this is indicative of structural differences in the governance systems. The EU system shares up the enforcement capacity between Member States, but presents a challenge to coordinate the conduct of platforms across borders. The centralised approach in China limits the coordination problems, but at the same time provides a unique institutional and procedural framework and an enforcement accountability mechanism. This variant exemplifies a dialectic between the need to be efficient in enforcement and protecting the rights of the individual, which is dealt with in different ways in different legal systems and institutional frameworks (Sukarmi et al., 2024).

### ***Comparative Effectiveness of Regulatory Models***

The comparative analysis shows that there is a set of trade-offs between certainty, flexibility, timeliness, and procedural protections in designing regulation, and that there is not a single architecture that is best for all the dimensions. By putting in place proactive obligations, without the need for a finding of infringement, the ex-ante model, as it is applied by the EU's Digital Markets Act and the UK's DMCCA, tackles the remedial lag highlighted in this study by reducing the timeframe in which market positions can be strengthened. The ex-ante model has some limitations, however. The quantitative designation thresholds can give rise to under-inclusion or over-inclusion, whereas the German hybrid model provides increased flexibility in the assessment of the authority by case-by-case but has less legal security. In the state-directed model (as in China), the competition enforcement functions in a different normative framework, where the aim of the enforcement is more to serve the interests of industrial policy, and which requires examining a conundrum with respect to efficiency and fairness of the enforcement. The advantages and disadvantages of each model vary with respect to certainty, flexibility, timeliness, and safeguards; they are likely to perform differently in different institutional and legal settings.

### ***Policy Implications***

To the extent that this study identified gaps in policy, it shows how several policy implications can be drawn from the findings. One, as indicated in Table 2, remedial lag has been a recurring problem in all jurisdictions, indicating the need to incorporate ex ante requirements and retain ex post enforcement power to effectively address the time lag between conduct and remedy while allowing flexibility to constrain new conduct not covered by the ex-ante requirements. Second, mandate fragmentation as a separate regulatory gap (Table 2) suggests that the need for inter-agency coordination mechanisms is a need for formalisation to address regulatory gaps that are being taken advantage of by dominant platforms. Third, the inadequacies of the consumer welfare standard found in the doctrinal analysis (Table 1, Table 2) justify using multi-dimensional criteria in addition to price-based harm, which include data protection, consumer autonomy and market contestability. Fourth, the diversity of remedies noted in the different regulatory models (Table 3) indicates the need for a shift in remedial policies from focusing only on behavioural to also structural forms of market power. These recommendations are proposed as informed recommendations that would need to be operationally implemented and tested at the jurisdictional level to determine their effectiveness in the specific context.

## **Conclusions and Implications**

This report pinpoints, examines and recommends remedies to the challenges of regulation and enforcement of digital platforms against anti-monopoly and anti-unfair competition laws. The aims were achieved in a qualitative multi-method doctrinal analysis, comparative law, economic-legal interpretation and regulatory practice evaluation study design in the EU, US, UK, Germany and China.

The qualitative synthesis is used to support the H1–H3. Traditional enforcement tools are constrained by the characteristics of platforms, such as network effects, concentration of data, coordination of algorithms, multi-sided markets, cross-border activities, and the speed of innovation cycles. Second, there are six ongoing gaps in modern competition law systems (see Table 2) which include a systemic lag in the area of remedial action, showing that there is a lag time between anti-competitive behavior and intervention by competition law. Third, regulatory architectures incorporating ex ante obligations with retained ex post enforcement capacity exhibit unique benefits in the context of remedial lag, with regard to their intervention mechanisms. Third, regulatory architectures that have both ex ante obligations and retained ex post enforcement capacity have distinctive benefits with regard to intervention mechanisms to address remedial lag.

The findings of this research can be used to enhance legal and economic knowledge in three aspects. It depicts digital platform competition law doctrinal gaps qualitatively. It shows, using comparisons, the implications of regulatory architecture design for enforcement practice. Such a systemised analytical structure, based on platform economics, legal doctrine and regulatory effectiveness, can have an impact on future empirical studies. Because this study is qualitative, the results of this study cannot quantify the instances of gaps that were found. Empirical investigations of larger samples of enforcement proceedings are needed for quantification.

These findings lead to four recommendations: (i) harmonization of regulatory regimes that include a combination of ex ante obligations and retained ex post enforcement powers; (ii) formalization of institutional arrangements for inter-agency cooperation to fill gaps in regulation; (iii) integration of multi-dimensional harm concepts (data protection, consumer autonomy, market contestability) with price-based effects; and (iv) reform of remedial systems to include a more structured approach to structural market power.

## ***Suggestions for Future Research***

As the Digital Markets Act is being implemented, the experience of its operation and the effect of the UK Digital Markets, Competition, and Consumers Act should be explored through research. A comparative analysis of the effectiveness of remedies in a jurisdiction would help to define best practices. Competition enforcement should be studied in relation to data protection and AI laws. This doctrinal work of synthesis may be complemented by a qualitative study of the prevalence and impact of the six gaps in more extensive enforcement actions.

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