Digital Markets in the Age of AI: Legal Control, Economic Consequences

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Abstract. *The integration of Artificial Intelligence (AI) into the digital environment has shifted market dynamics toward a winner-take-all reality where data became the main factor of production, making dominant platforms act as gatekeepers. This study investigates the economic consequences of the European Union's Digital Markets Act (DMA) and Digital Services Act (DSA), evaluating whether the new legal controls are efficient in correcting market failures or instead they cause the EU to fall behind in the global economic race. To what extent does the persistence of information asymmetry (DSA) function as a behavioral barrier that maintains gatekeeper market share (DMA) despite increased regulatory enforcement? Current literature characterizes these digital systems by extreme scale economies, emphasizing the necessity of draining data moats to foster contestability and fairness. However, recent research also identifies a transparency paradox, suggesting that the user remains vulnerable due to information overload and addicting design, despite the fact that platforms fulfill their procedural disclosure requirements. Moving beyond a broad descriptive analysis, the paper investigates the potential association between user-level behavioral constraints and macro-level market concentration. Using a triangulation methodology, this paper cross-examines institutional legal records, empirical market metrics, and behavioral economic theory. A conceptual regression model is introduced to analyze the friction gap, testing the hypothesis that high consumer search costs neutralize the DMA's efforts to decentralize digital markets.*

Keywords: Artificial Intelligence (AI), Digital Markets Act (DMA), Digital Services Act (DSA), Gatekeepers, Transparency

Introduction

The rapid evolution and spread of Artificial Intelligence (AI) has fundamentally restructured the global digital sector, transforming data into a primary product. In the modern era, the usage of social media platforms has reached unmatched levels, with the average user spending several hours daily across different platforms. This engagement generates a continuous stream of high-quality data, which AI uses to achieve competitive accuracy. Therefore, the traditional market dynamics of the digital sector have shifted toward a "winner-take-all" reality, turning dominant platforms into digital "gatekeepers" that have the power to control the entire market and extract significant economic rents. While these integrated systems can offer consumer convenience, at the same time they create "bottleneck" effects that affect smaller enterprises.

To address these emerging market failures, the European Union came up with a regulatory response focused on the Digital Markets Act (DMA) and Digital Services Act

(DSA). These new regulations are designed to ensure fairness and contestability into the market before monopolistic harm becomes irreversible. This paper argues that while these laws establish essential safety standards and ethical safeguards, they significantly affect the market efficiency that carries economic trade-offs.

The core objective of this research is to investigate the broader economic consequences of the DMA and DSA, moving beyond the legal angle. Through a triangulation of the 2026 proceedings against Alphabet and TikTok, this research evaluates whether the EU's quest for digital domination is also creating a transparency paradox that protects incumbents while holding back the innovation it seeks to promote.

The investigation is guided by two central research questions designed to evaluate the trade-off between legal control and economic consequence:

RQ0: To what extent has the DMA successfully decentralized the search engine market by lowering barriers to entry for competitors?

RQ1: Does the transparency mandated by the DSA effectively reduce information asymmetry, or does it increase consumer search costs?

The following hypotheses serve as the foundation for the empirical analysis:

H0 (Structural): The implementation of the DMA has not significantly reduced the market share of digital gatekeepers because structural remedies are being neutralized by behavioral factors.

H1 (Causal): Higher levels of information asymmetry, driven by addictive design, are positively correlated with the stability of a gatekeeper's market position.

Literature review

Digital Markets Act (DMA)

The European Commission explains the Digital Markets Act (DMA) as “the EU’s law to make the markets in the digital sector fairer and more contestable”, by establishing a set of clearly defined objective criteria to identify “gatekeepers”.

Gatekeepers are defined as “large digital platforms providing so called core platform services, such as online search engines, app stores, messenger services”. Gatekeepers will have to comply with the obligations and prohibitions listed in the DMA. The European Commission designated Alphabet, Amazon, Apple, Meta, and Microsoft as initial gatekeepers under the Digital Markets Act (DMA) in September 2023, with obligations fully effective from March 7, 2024. These companies, along with later additions like Booking, must comply with strict rules ensuring fair competition and platform interoperability. The designation of gatekeepers is not only a matter of company size, but a reflection of a firm's well established economic position and its role as a core platform service provider. (Figure 1) As presented by Cabral et al. (2021) in the JRC Report, these platforms benefit from extreme scale economies and network effects, which lead to market concentration. In AI markets, the marginal cost of serving an additional user is nearly zero, while the value of the data collected from that user is immense. This creates a “bottleneck" effect where smaller businesses become increasingly dependent on a few giants to access consumers. The DMA aims to ensure these gatekeepers do not use their position to extract unfair economic rents from the ecosystem.

The DMA represents a shift in European competition policy, moving away from the traditional "ex-post" enforcement toward an ex-ante regulatory framework. According to

Pošćić (2024), this preventive approach is designed to ensure "more contestability and openness" by setting clear rules for large platforms before they can engage in anti-competitive behavior.

One of the most significant economic goals of the DMA is to drain the data moats held by incumbents. In AI-driven markets, data is the main factor of production, and an incumbent's exclusive access to massive datasets creates a barrier to entry that would be impossible for startups to overcome. To combat this, the DMA forbids the unauthorized combination of personal data across different services, preventing the creation of a Data Super-Moat that the competitors would simply not be able to replicate. As Krämer (2020) argues, mandatory data portability and real-time access are essential policy measures to safeguard innovation, as they reduce the information asymmetry that currently favors large platforms over the smaller businesses that operate within their ecosystems.

A central pillar of the DMA is the promotion of market contestability. This concept, as explored by Scott Morton et al. (2024), implies that even a dominant platform should be vulnerable to replacement by a more efficient rival if the playing field is level. To achieve this, the DMA mandates interoperability, requiring gatekeepers to allow third-party services to function alongside their own. Economically, this is designed to lower switching costs - the time and effort hurdles that keep users dependent on a specific platform. By banning self-preferencing, where a gatekeeper ranks its own products higher than those of rivals, the EU seeks to prevent platform envelopment, ensuring that a superior AI tool from a startup is not buried by a gatekeeper's own integrated version.

Despite the aim of creating a fairer market, the DMA has introduced significant economic trade-offs, often referred to as the Innovation Gap. The CCIA Economic Impact Report (2025) suggests that the reduction in platform integration could lead to efficiency losses costing EU businesses up to €114 billion in revenue. Furthermore, data from the NBER (2025) shows that monthly EU AI deals led by US investors fell by 20.6% post-enforcement, suggesting a potential chilling effect on venture capital. While the law intends to help SMEs, Eurostat (2025) data indicates a widening gap, with only 17% of small enterprises adopting AI compared to 55% of large firms. This highlights a tension between the legal goal of fairness and the economic reality of compliance costs, which for large firms average $430 million annually.

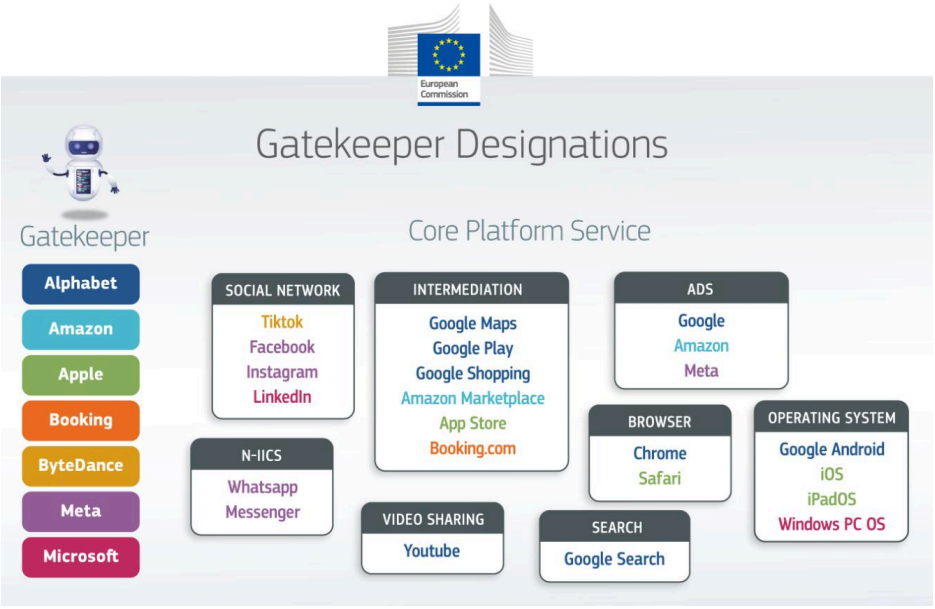

Figure 1. Gatekeeper designations

Source: European Commission

Digital Services Act (DSA)

Digital Services Act (DSA) is a set of regulations for online services imposed by the European Union (EU), constituting one of the most important parts from the digital regulation strategy. As stated by the European Commission, the motivation for concluding the DSA is to ensure safety and transparency, shaping a protected space for both the smaller platforms that are looking forward to scaling up and the citizens whose fundamental rights are protected. The entry into force of the DSA in the EU is on 16th November 2022.

One key element in analyzing this legal framework is identifying and categorizing the companies that should comply with the obligations of these regulations. The DSA expressly stipulates what providers of the intermediary services should be held accountable, defining 3 main categories in which the companies can find themselves: mere conduit, caching, and hosting, as seen in Figure 2. Consequently, the framework imposes different compliance requirements for each category of intermediary services. Nonetheless, the common aspect is that they all operate in the EU, regardless of the country in which they have been established.

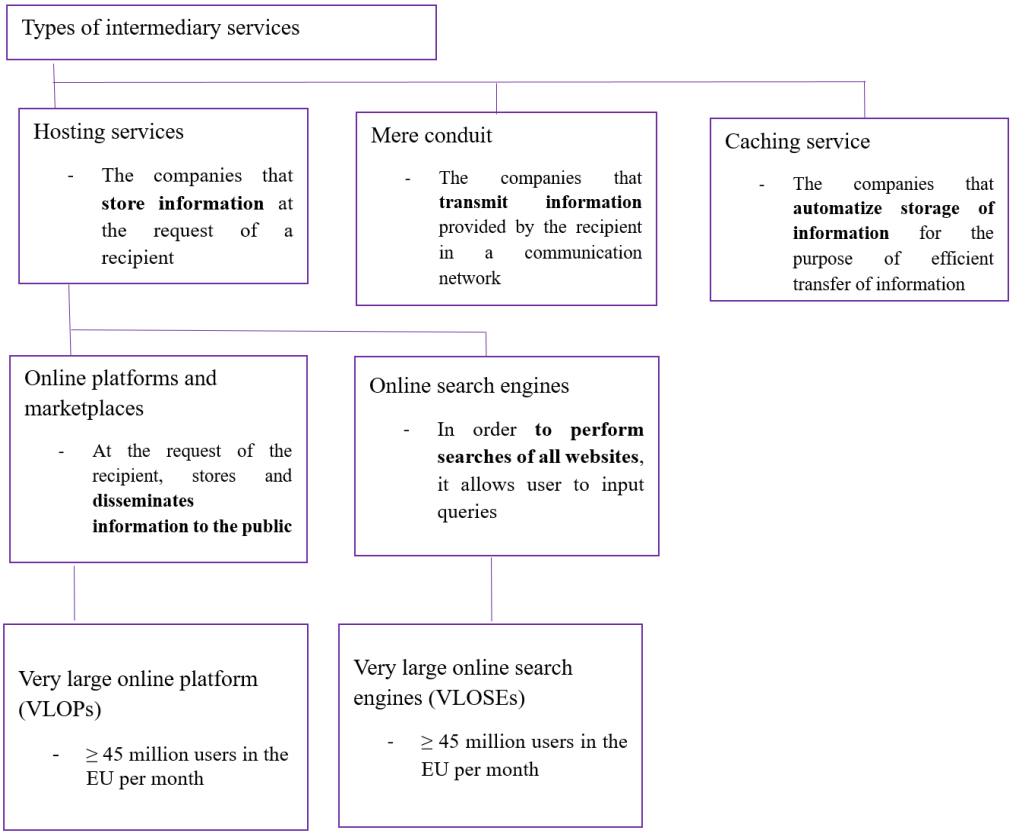

Figure 2. Hierarchy of Intermediary Services under the DSA

Source: Authors' own research (Adapted from Regulation EU 2022/2065)

According to the explanatory note on the European Commission's proposal, "The DSA follows a proportionate approach, which means that the obligations assigned to the different online players match their role, size and impact in the online ecosystem.", suggesting the fairness in the market is tried to be initiated. The main objective here is to empathize with the small platforms that emerge within this market, creating stricter regulations and sanctions for the bigger online platforms, which are recognized as Very Large Online Platforms (VLOPs) and Very Large Online Search Engines (VLOSESs) by the criteria of having more than 45 million users in the EU per month. One distinctive measure that the

bigger digital platforms must comply with is the fact that they must identify and analyze the risks and to find ways to diminish them. In order to better understand the extent to which this regulation goes, the press release from the European Commission in February 2026 can be further discussed. This recent example finds the platform TikTok suspected to breach the DSA for its algorithm that constantly keeps the users engaged, by offering them, as a prize, new content which generates dopamine boosts that make the human brain want more. In accordance with Article 66 of the DSA, the European Commission has conducted an investigation into a suspected infringement in which the breach was confirmed, implying that TikTok might have the obligation to pay a fine that can come close to 6% of their total global annual turnover.

Regarding AI, scholars have continuously discussed its usage of it and the links with the manipulation of the users, especially when it comes to the digital companies. The term "manipulation" can be defined as a way of influencing others, without taking into account the autonomy of the person that is being influenced, in order to gain immoral advantages (Susser et al. 2019b; Raz 1988). With the rise of AI, the manipulation of users has become a normality, as most people agree and even expect personalized data to come their way (Schmidt et al. 2018). The issue here isn't the development of technology that connects people with what they need more easily, but the process itself, as its opacity did not reveal what kind of data has been collected and how the model reached a decision (Gesmann-Nuissl & Meyer, 2023). In this context, the DSA has introduced article 27 "Recommender system transparency" which requires the online platform providers to offer to their users information that explains in an intelligible language the parameters that are taken into account along with the alternative of the users to change or adapt these parameters. Even though the regulatory framework here enhances the transparency and its understanding by every user, E. B. Akkanat-Öztürk (2025) argues that "The result is a transparency paradox: platforms are more transparent than ever in a procedural sense, yet users are more vulnerable than ever in a substantive sense." In his paper, E. B. Akkanat-Öztürk addresses the idea that in a world where transparency is promised, the VLOPs are still benefiting from providing pages full of informational overload written in a format that is difficult to understand even by scholars. Thus, by complying with legal requirements, the companies are rather imposing a barrier to Market Efficiency by creating an asymmetry of information. By not disclosing directly how they gather personal data and how they use it, users cannot make fully informed decisions, resulting in preserving their economic advantages.

Taken together, the existing literature reveals a significant gap between the intended and observed effects of the DMA and DSA. While scholars such as Cabral et al. (2021) and Scott Morton et al. (2024) argue that structural remedies like data interoperability is a necessary condition for contestability, a more recent strand of research represented by Akkanat-Öztürk (2025), highlights that these structural tools are insufficient on their own when users remain trapped by behavioral architecture. This paper positions itself at the intersection of these two debates, arguing that the behavioral dimension is the critical missing variable in current assessments of regulatory effectiveness. Rather than viewing the DMA and DSA as competing frameworks, this study proposes that their interaction generates a friction gap: structural openness mandated by the DMA is systematically neutralized by the information asymmetry that the DSA has so far failed to resolve at a substantive level.

Methodology

Research purpose and objectives

This study utilizes a mixed-methods empirical approach, which cross-examines qualitative legal analysis with quantitative regression aiming to assess the interaction between EU digital regulations and market performance.

The research is structured around three main objectives:

O0: Analyze the persistence of Market Share concentration in the search engine sector following the implementation of the DMA.

O1: Identify how addictive design and autopilot behavior maintain information asymmetry, preventing users from making the rational choices intended by the DMA.

O2: Test the correlation between these two factors using a mixed-methods approach, establishing whether behavioral friction (DSA) is the primary reason structural competition (DMA) is failing to decentralize the market.

Quantitative and Qualitative Components

The study adopts a mixed-methods empirical approach to provide a multi-layered analysis of digital regulation:

Quantitative Component: The research utilizes an Exploratory Ordinary Least Squares (OLS) Regression model analyzed using Excel Calculations to determine the relationship between regulation and market outcomes. The quantitative analysis focuses on the market share persistence. Instead of treating the figure as a static observation, it is used as the dependent variable in a conceptual regression model, providing a quantitative framework for the interaction between regulation and market outcomes. The goal is to measure how much user lock-in (independent variable) influences the stability of the gatekeeper's market position. Given the recent nature of the DMA and DSA implementation, this model operates on a limited dataset of 26 observations (data from January 2024 to February 2026). The paper has used the particular case of Google's Market Share, analyzing it before and after the implementation of the legal framework in the EU market, and, for determining the impact of the behavioral economics in the digital market, the study employs proxy variables: X1 (DMA Regulation), a binary dummy variable (0 or 1) marking the pre and post-enforcement periods of the DMA and X2 (Information Asymmetry), an index that was constructed by assigning a rating (1-10) based on the intensity of autopilot design and transparency failures documented in the 2026 TikTok preliminary findings.

The regression equation is constructed as:

$$y=\beta0+\beta1X1+\beta2X2+\varepsilon$$

Where:

$\beta0$= the intercept

$\beta1$= the coefficient for the EU regulation

$\beta2$ = the coefficient for the information asymmetry

ε = the error term, according to other external market factors.

Qualitative Component: A content analysis of regulatory proceedings is conducted to categorize the types of design friction used by platforms. It focuses on how this component deep-dives into the European Commission's 2026 findings regarding Alphabet and TikTok's addictive design to provide context for the quantitative results. The main objective of this

qualitative component is to categorize the types of design friction that prevent users from switching platforms, providing the context for the quantitative results.

The Triangulation Model

This research will be concluded through an Integrated Research Design utilizing a Mixed-Methods Triangulation Model to ensure the depth of the findings. Rather than treating qualitative and quantitative data as isolated components, this model uses the legal framework (DMA/DSA) to define the regulatory intent, the econometric regression (OLS) to quantify market response, and the behavioral case study (TikTok) to identify the psychological mechanisms driving the statistical outcomes. As illustrated in Table 1, the indicators are cross-examined through a multi-layered strategy to determine why structural remedies often fail to produce expected economic results.

Table 1. Summary of indicators

Indicator	Legal Focus	Empirical Variable	Primary Data Source
Market Decentralization	DMA	Google's market share	StatCounter GlobalStats
Information Asymmetry	DSA	Information asymmetry index (rating 0-10)	European Commission TikTok Preliminary Findings
Regulatory Impact	DMA	Binary dummy for DMA Enforcement	European Commission Alphabet Proceedings (2026)

Source: Authors' own research

Data collection

To ensure that the research paper reaches its purpose and objectives, the collection of data has been concluded using the multi-layered strategy, according to the triangulation model. Thus, the information gathered can be identified in one of the following categories: Institutional, Market and Behavioral.

Primary data is sourced from institutional and regulatory records, specifically focusing on the European Commission's official repositories regarding Article 6 of the DMA and Article 27 of the DSA. This includes an analysis of the January 2026 proceedings against Alphabet and the February 2026 preliminary findings concerning TikTok's service design. These records allow for a qualitative assessment of how legal provisions are being applied to current platform behaviors.

Table 2. Variables used for the regression analysis 01.2024-02.2026

Month	Google Market Share(Y)	DMA reglemenation (X1)	Information Asymmetry (X2)
2024-01	91,39	0	9
2024-02	91,04	0	9
2024-03	91,38	1	9
2024-04	91,47	1	9
2024-05	91,23	1	9
2024-06	90,96	1	9
2024-07	91,30	1	9
2024-08	91,22	1	9
2024-09	90,41	1	9
2024-10	90,26	1	9
2024-11	90,27	1	9
2024-12	90,64	1	9
2025-01	90,22	1	9
2025-02	90,12	1	9
2025-03	89,54	1	9
2025-04	89,46	1	9
2025-05	89,45	1	9
2025-06	89,91	1	9
2025-07	90,22	1	9
2025-08	90,28	1	9
2025-09	89,21	1	9
2025-10	88,85	1	9
2025-11	88,99	1	9
2025-12	89,36	1	9
2026-01	88,21	1	10
2026-02	87,53	1	10

Source: Authors' own research

To assess the real-world implications, the research incorporates market performance metrics extracted from StatCounter GlobalStats. This quantitative data is used to monitor shifts in user behavior following the introduction of mandatory choice screens and to determine the stability of browser and search engine market shares. By analyzing these trends, the study identifies whether legal mandates have successfully triggered structural changes in market decentralization or if network inertia continues to preserve the dominance of designated gatekeepers.

Finally, the study utilizes a unique behavioral operationalization method to bridge the gap between qualitative findings and quantitative modeling. To quantify the complex aspects of information asymmetry, an asymmetry index is developed by assigning specific ratings, such as 9 or 10, based on the addictive design features documented in the 2026 TikTok preliminary findings. These ratings represent a measurable choice architecture that prioritizes platform rent extraction over user agency, effectively raising consumer information search costs to a level that neutralizes standard transparency disclosures. This index allows the research to prove whether behavioral friction is the primary driver of market stagnation. It should be noted that these ratings are based on qualitative content analysis of regulatory documents and therefore carry an inherent degree of subjectivity.

Results and Discussions

Market contestability and the persistence of dominance

The economic purpose of the Digital Markets Act is rooted in the theory of Contestable Markets, which states that the only threat of entry by a more efficient rival should discipline the behavior of a dominant firm. In the digital AI sector, however, contestability is not a function of removing legal barriers, but it is a battle against Network Inertia and Data Moats.

Under the DMA, the prohibition on combining personal data across services, like Meta combining WhatsApp data with Instagram profiles without explicit consent, was

intended to prevent the formation of a Data Super-Moat. The economic logic is clear: if a startup cannot replicate the depth of an incumbent's dataset, it cannot train a competitive AI model. Contestability requires low switching costs. While the DMA mandates interoperability and choice screens, allowing users to select alternative search engines, the economic reality is governed by default bias. As seen in the 2024-2026 market share data for Google, the introduction of choice screens has failed to trigger a mass exodus. This persistence is driven by two factors: firstly, the ecosystem effect, where the integration of AI assistants across multiple software layers makes switching to a different platform a burden rather than a simple choice. Secondly, as explored in this paper's regression model, the time-cost for a user to evaluate a new competitor often outweighs the perceived benefit of leaving a gatekeeper's ecosystem.

Figure 3. Search Engine Market Share in Europe Jan 2024- Feb 2026

Source: Authors'own research (Adapted from StatCounter GlobalStats)

The result is a contestability gap where markets are legally open but behaviorally closed. The 2026 preliminary findings against TikTok illustrate that even when a platform fulfills its procedural disclosure requirements under the DSA, the addictive design works as a behavioral barrier. In this environment, dominance is not maintained through superior efficiency alone, but through the exploitation of cognitive biases that keep the market in a state of artificial equilibrium.

The regression analysis

The regression was constructed in order to assess the correlation between Google's market share, in order to observe any patterns for other gatekeepers, and two independent variables: the implementation of the DMA and the persistence of information asymmetry. With the Multiple R equal to 0.69, we can conclude that the correlation between the variables is a strong one, while the R Square output confirms that 47% of market fluctuations are explained by the model.

Since the P-value for the DMA (0.096) exceeds the standard 0.05 threshold, we fail to reject the null hypothesis of regulatory ineffectiveness for this specific period. This suggests a limited short-term impact of the DMA on Google's structural dominance, as the market share remained largely stagnant around 88%. In contrast, the Information Asymmetry variable (X2) is highly significant (P=0.0004). While these results are restricted to a single gatekeeper case, they provide preliminary evidence that behavioral patterns, such as the autopilot mode documented in the TikTok case, have a more immediate influence on market stability than current structural legal acts. It is important to note that these findings represent the early post-enforcement era, offering a clear perspective on how strict regulations might encounter

friction, the results from a single search engine cannot be generalized to the entire digital ecosystem without further long-term longitudinal data.

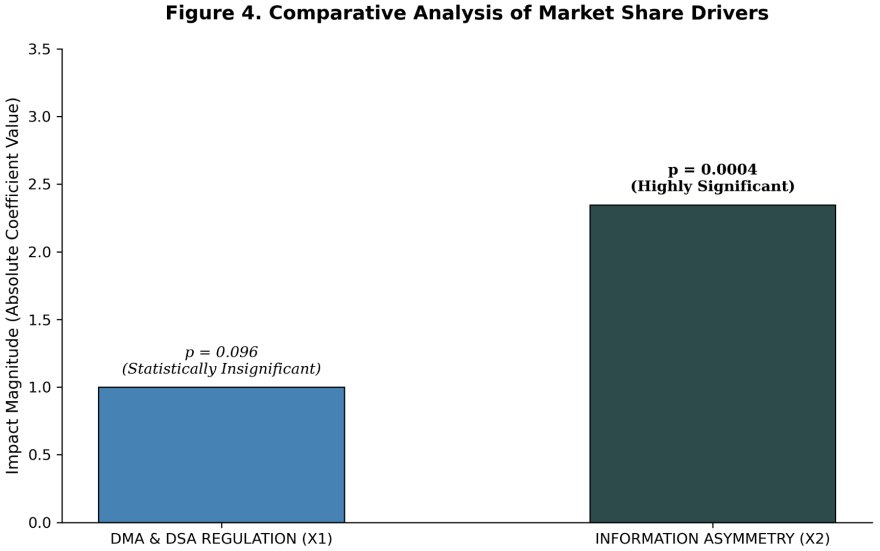

Figure 4. Regression Analysis Results

Source: Authors' own research

These findings suggest that, while Google's market share has declined, this is not due to the regulations imposed by the EU, but rather because of the information asymmetry, providing insights on how the legal acts wish to influence the digital market and what it actually manages to do. Even though clear limitations can be found within this analysis, the results offer a clear perspective on how the strict regulations cannot offer the benefits that it promises, but rather they constitute impediments to AI developments. Nevertheless, the results offer preliminary evidence that behavioral frictions may be limiting the short-term effectiveness of structural regulation, warranting further longitudinal research across multiple gatekeepers and jurisdictions.

The information asymmetry

The press release from February 2026 which informed about the preliminary findings against Tiktok provides evidence about the transparency paradox identified in the Literature Review, that suggests the distinction between the information that is provided and the information that reaches the user. With the addictive design that the platform has implemented, it manages to put the user in an autopilot mode, resulting in a case of behavioral economics in which the constant engagement with the content increases the Consumer Information Search Costs, meaning that the user will require too much time to analyze all the legal notifications. This suggests that the DSA, a legal framework that intends to improve transparency is actually worsening the problem, by requiring the gatekeepers to add even more information in their legal disclosures. As a possible solution to this problem, the Commission should try prioritizing the quality over quantity, at least when it comes to the "push" notifications that each user should receive.

Evaluation of Research Hypotheses

Returning to the hypotheses formulated, the empirical results allow for the following assessments. H1, which proposed that the DMA has not significantly reduced the market share of digital gatekeepers because structural remedies are being neutralized by behavioral factors, is supported by the regression findings. The P-value for the DMA variable exceeds the standard 0.05 significance threshold, indicating that the enforcement of the DMA alone cannot account for a statistically significant shift in Google's market share over the observed period. The market share remained largely stagnant at approximately 88%, consistent with the hypothesis that structural interventions are insufficient when behavioral lock-in persists. H2, which proposed that higher levels of information asymmetry, driven by addictive design, are positively correlated with the stability of a gatekeeper's market position, is likewise supported by the data. The Information Asymmetry Index (X2) emerges as highly significant, suggesting a strong positive association between the intensity of autopilot design features and the persistence of gatekeeper dominance. This is further suggested by the qualitative evidence from the TikTok preliminary findings, which document how engagement-maximizing algorithms systematically raise consumer information search costs. Taken together, both hypotheses find preliminary empirical support within the constraints of this study's scope, reinforcing the central argument that the behavioral dimension represents the critical gap in the current EU regulatory framework.

Conclusion

This research paper finds preliminary evidence that the European Union's digital regulatory framework generates significant trade-offs between fairness objectives and market efficiency. While the legal frameworks have successfully established rules for the digital age, their economic efficacy is currently being undermined by the behavioral complexities they sought to address. The empirical results of the OLS regression model provide the following insight: the implementation of the DMA has not yielded a statistically significant reduction in gatekeeper market share. Instead, the Information Asymmetry Index emerges as the dominant predictor of market stability. This confirms the existence of a Transparency Paradox, where increased legal disclosures under the DSA have increased consumer search costs, reinforcing the autopilot behavior that benefits platforms like Alphabet and TikTok. Furthermore, the Innovation Gap identified in the results suggests that the current regulatory may be trading long-term global competitiveness for short-term procedural fairness. For the DMA and DSA to truly achieve their goals, the European Commission should move beyond procedural transparency and toward behavioral neutrality. In digital markets, competition is no longer defeated by barriers to entry, but by barriers to attention of the users.

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Appendix 1 - Regression Analysis Calculations

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,689463137
R Square	0,475359418
Adjusted R Square	0,429738498
Standard Error	0,781386221
Observations	26

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	12,72387972	6,36193986	10,4197683	0,00060036
Residual	23	14,04298182	0,610564427		
Total	25	26,76686154			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	112,3281818	5,223133993	21,50589703	9,87853E-17	101,5233059	123,1330577	101,5233059	123,1330577
DMA reglemenation (X1)	-0,999090909	0,57709197	-1,731250755	0,096801911	-2,192896605	0,194714787	-2,192896605	0,194714787
Information Asymmetry (X2)	-2,345909091	0,57709197	-4,065052388	0,000478576	-3,539714787	-1,152103395	-3,539714787	-1,152103395